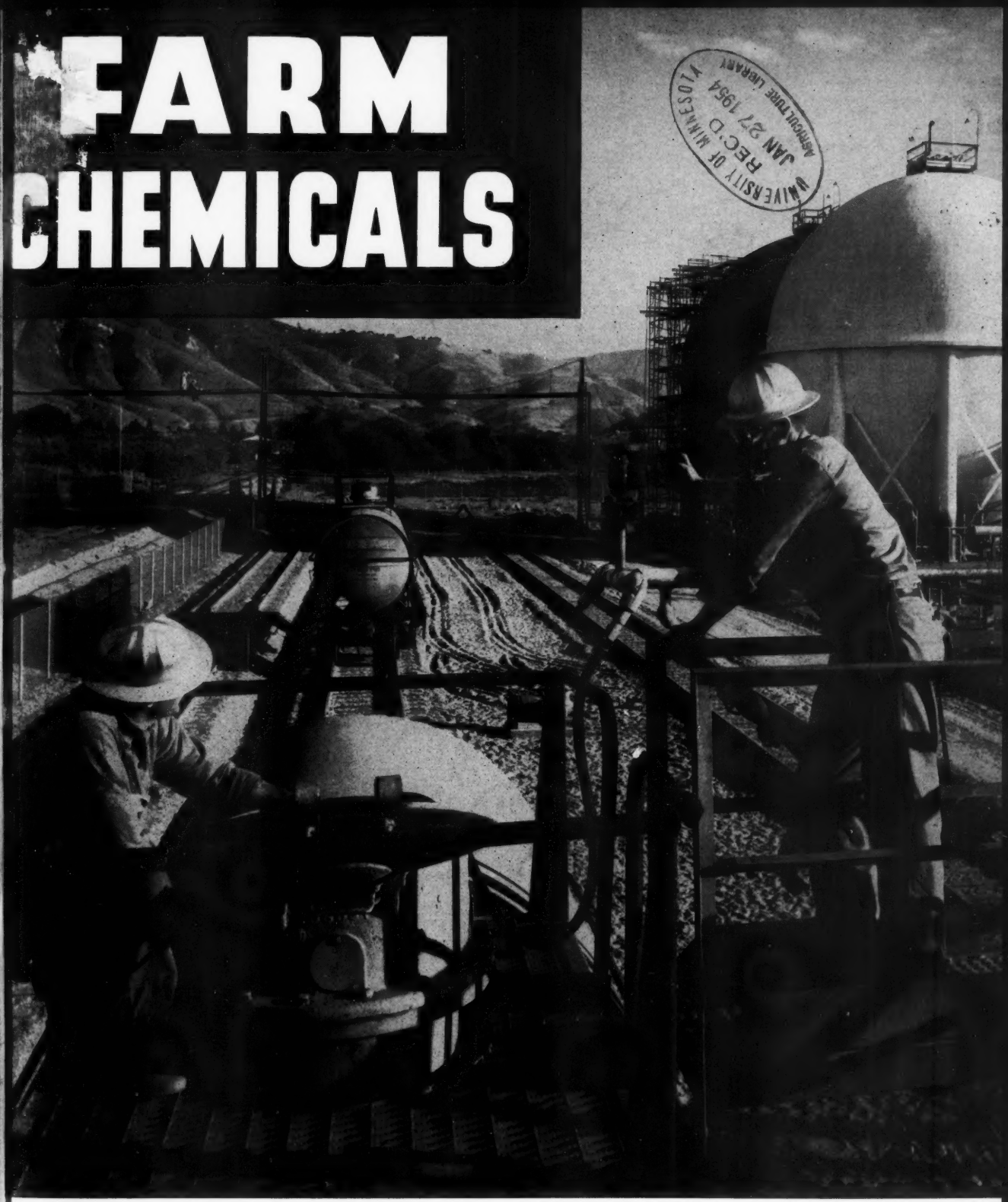
FARM CHEMICALS



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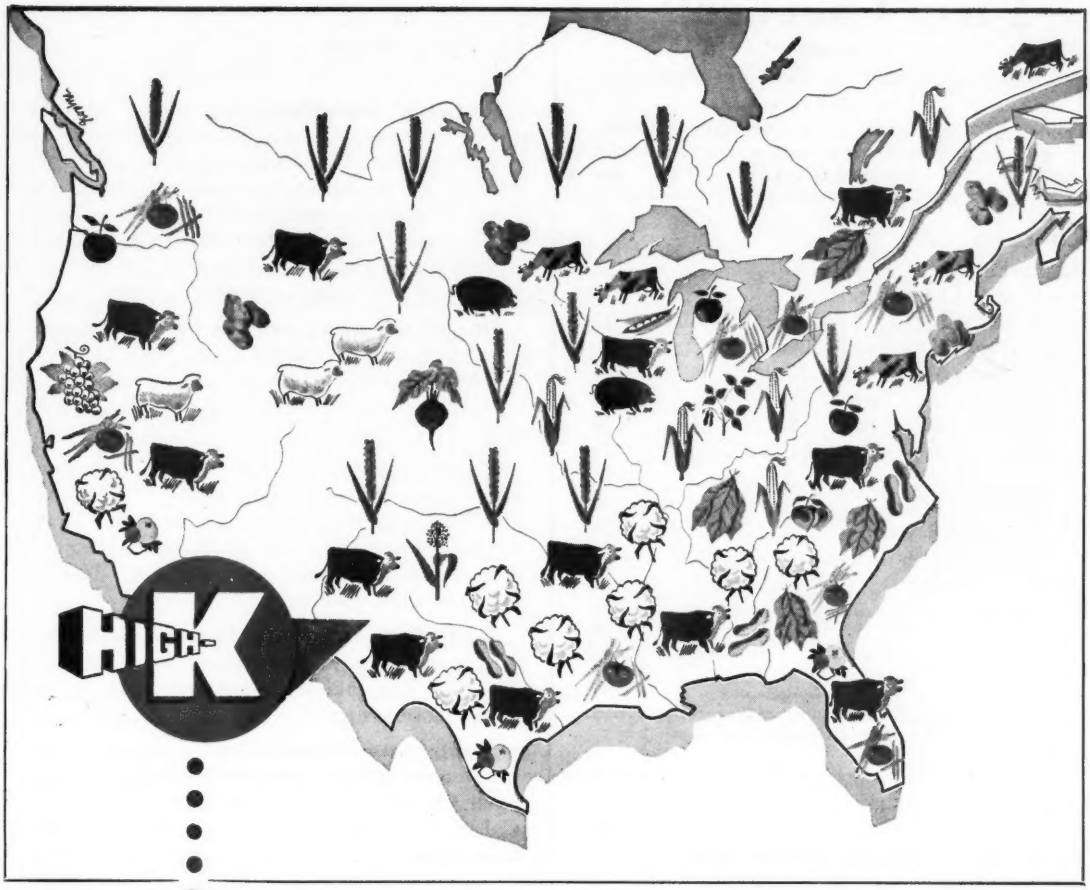

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PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 117 **JANUARY, 1954** **No. 1**

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Cover Story

Loading yard of new Shell Chemical Corp. anhydrous ammonia plant which was opened last month in Ventura, Cal. Refrigerated storage spheres, background, hold ammonia production preparatory to shipment by rail tank cars. Complete story, page 26.

A magazine national in scope and circulation and devoted to manufacturers, mixers, and formulators of fertilizers and pesticides

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In this issue . . .

Pesticide manufacturers didn't make much money last year, according to a representative sample, but things weren't as bad as they seemed for a while. That is the interpretation we made from a special FARM CHEMICALS questionnaire of the pesticide industry, described on page 9. The article quotes many leaders on the subjects of profits, inventories, price trends and marketing methods.

One of the most modern fertilizer plants in the country is located in Homestead, Fla. That, at least, is the claim of Florida East Coast Fertilizer Co. After reading the picture feature on pages 14 and 15, you probably will agree.

Having trouble keeping up with all the new products constantly being developed in the fertilizer and pesticide industries? So are we, frankly. That's why we attempted to round up a brief description of products in the farm chemicals field developed or tested in 1953. See page 17.

DDT that will withstand tropical conditions isn't easy to make, but Michigan Chemical Corp. made it. Read about the company's special program in the picture story on page 25.

Anhydrous ammonia is a vital need in the West where most lands need a lot of nitrogen. That's why Shell Chemical Corp.'s new NH_3 plant at Ventura, Cal. is in the news this month. Turn to page 26 for more details.

The drive for high analysis fertilizers reached a new peak last month with announcement of a plant food TVA is experimenting with that contains 97 per cent nutrients. Page 28.

Do you know how to get along with people? This important social problem, of interest to salesmen, foremen and vice presidents as well, is discussed in an interesting article starting on page 29.

A new line of tractor shovels to handle bulk materials has been developed by Clark Equipment Co. The shovels, which have application in the fertilizer industry, are described on page 33.

Legislation is an important governing factor on the actions of the pesticide industry. Read what NAC's Lea Hitchner says about it on page 34.

Latest news on the war against cotton insects was presented at the Cotton Insect Control Conference last month in Memphis. For our coverage, see page 39.

Added insurance that seeds will germinate after they are planted is contained in the report from DuPont of an improved seed treatment that has fungicidal as well as insecticidal action. Story, page 40.

Record after record is the pattern in fertilizer consumption. Last year it was up again, and indications from USDA are that another 11 per cent increase is in the offing. See page 43.

It would be impossible to describe everything that was exhibited at the Chemical Exposition last month, so we have tried to give the highlights, only.

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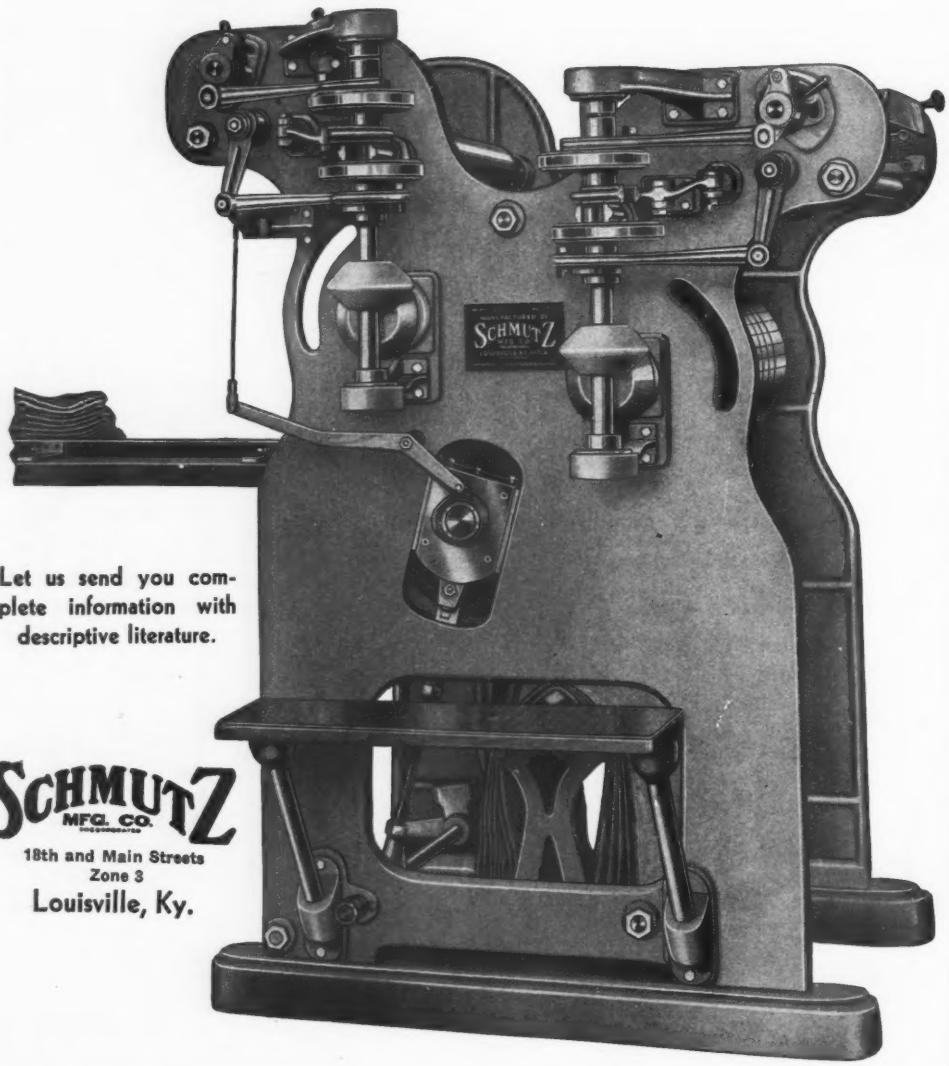

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Farm Chemicals industry notes

. . . Mostly Personal

Robert J. Zipse has joined John Powell & Co. division of Mathieson Chemical Corp. as domestic sales manager, according to an announcement by D. Alfred Weed, division vice president in charge of sales.

Zipse

R. H. Hodgson will be Zipse's assistant. Both men previously held similar positions with Geigy Chemical Co.

The Powell division, which is located in New York, manufactures insecticides, herbicides and other chemical pesticides.

Julius Hyman and Co. division of Shell Chemical Corp. has been renamed the Agricultural Chemicals division. Its new address is P. O. Box 1617, Denver, Colo.

Ross Rizley last month was named assistant secretary of agriculture by President Eisenhower. He will have general responsibility for agricultural stabilization in USDA. Secretary Benson has named Charles Figy to be an assistant to the secretary in charge of relations with state commissioners, secretaries and directors of agriculture.

Armour & Co. has appointed John M. Hoerner to the newly created position of Chemical division director of purchases and sales. He was previously employed by Atlantic Refining Co. At Armour, Hoerner will direct raw material purchases and the sale of chemical products.

Tilton H. Dobbin has been promoted to assistant treasurer of Mathieson Chemical Corp. and treasurer of the corporation's chemical divisions. He previously was director of commercial properties.

New assistant chief chemist of Diamond Alkali Co.'s Organic Chemicals division in Houston is F. W. Czech. Before his transfer, he worked in the company's Development division.

Superintendent of National Aniline division, Allied Chemical & Dye Corp.'s new plant at Moundsville, W. Va. is Ross M. Sims. Burnett G. Firstenberger is chief chemist.

Byron M. Kern recently was named chief engineer of Spencer Chemical Co.'s Pittsburg, Kan. plant, replacing George F. Klein Jr., who resigned. Robert A. Byorum was named assistant chief engineer.

Carl F. Prutton has resigned as president of Mathieson Development Co. and director of all Mathieson plants. He had been with Mathieson since 1949.

Paul Lipke has been named head of Dow Chemical Co.'s new technical service formulation laboratory. Maurice Q. Tessin is staff coordinator on polyethylene and Robert E. Monica is in charge of the calendering section.

Monsanto Chemical Co.'s associate director of research for the Western division, John T. Stephan, left the company to establish a consulting laboratory in Seattle.

Newly-elected chairman of the board of Michigan Chemical Corp. is Theodore Marvin, company president.

A New York district office has been opened by Pennsylvania Industrial Chemical Corp. in the News Building, 220 E. 42nd St. The company's Paterson, N. J. offices have been discontinued.

CALENDAR

Jan. 19—Comm. Chem. Development Assn. meeting, St. Louis.
Jan. 25—Fert. Mfrs. Conf., Ames, Ia.
Jan. 27-28—Cal. Weed Conf., Sacramento
Feb. 1-2—Nat. Cotton Council meeting, Atlanta, Ga.
Feb. 11-12—Crops, Soils and Fert. Conf., Stillwater, Okla.

Paul L. Weller has been named manager of Market Research for Spencer Chemical Co.

Weller

He had served as district sales manager of Wyandotte Chemicals Corp. in Cincinnati, O. from 1951 until recently and previously was director of Market Research for the same company.

Weller was graduated from Ohio State University in 1935 and was awarded a Masters Degree in Business Administration in 1938.

He will make his headquarters at Spencer's Kansas City's offices.

Lester G. Lundsted has been promoted from assistant director of research to director of chemical research at Wyandotte Chemicals Corp.

New member of Mathieson Chemical Corp.'s Market Development department is Dean A. Bixler. He went to the company from Proctor and Gamble.

George DeLaMater has been appointed associate director of organic research, Mallinckrodt Chemical Works.

A district sales office has been established by Monsanto Chemical Co.'s Organic Chemicals division in Atlanta, Ga. Howard A. Lovejoy Jr., former phosphate division employe, will manage the office.

Commercial Solvents Corp. has added Dean J. Kutchera, Wallace N. Davis and James F. McCarthy to its Industrial Chemicals division sales staff. Kutchera has been assigned to the Detroit district office, Davis and McCarthy to the Chicago area.

F. W. Berk & Co., Inc. has named Norman Sutcliffe manager of its West Coast office at 55 New Montgomery St., San Francisco 5. Sutcliffe also represents Berkshire Chemicals, Inc. in Washington, Oregon, California, Idaho, Utah, Nevada and Arizona.

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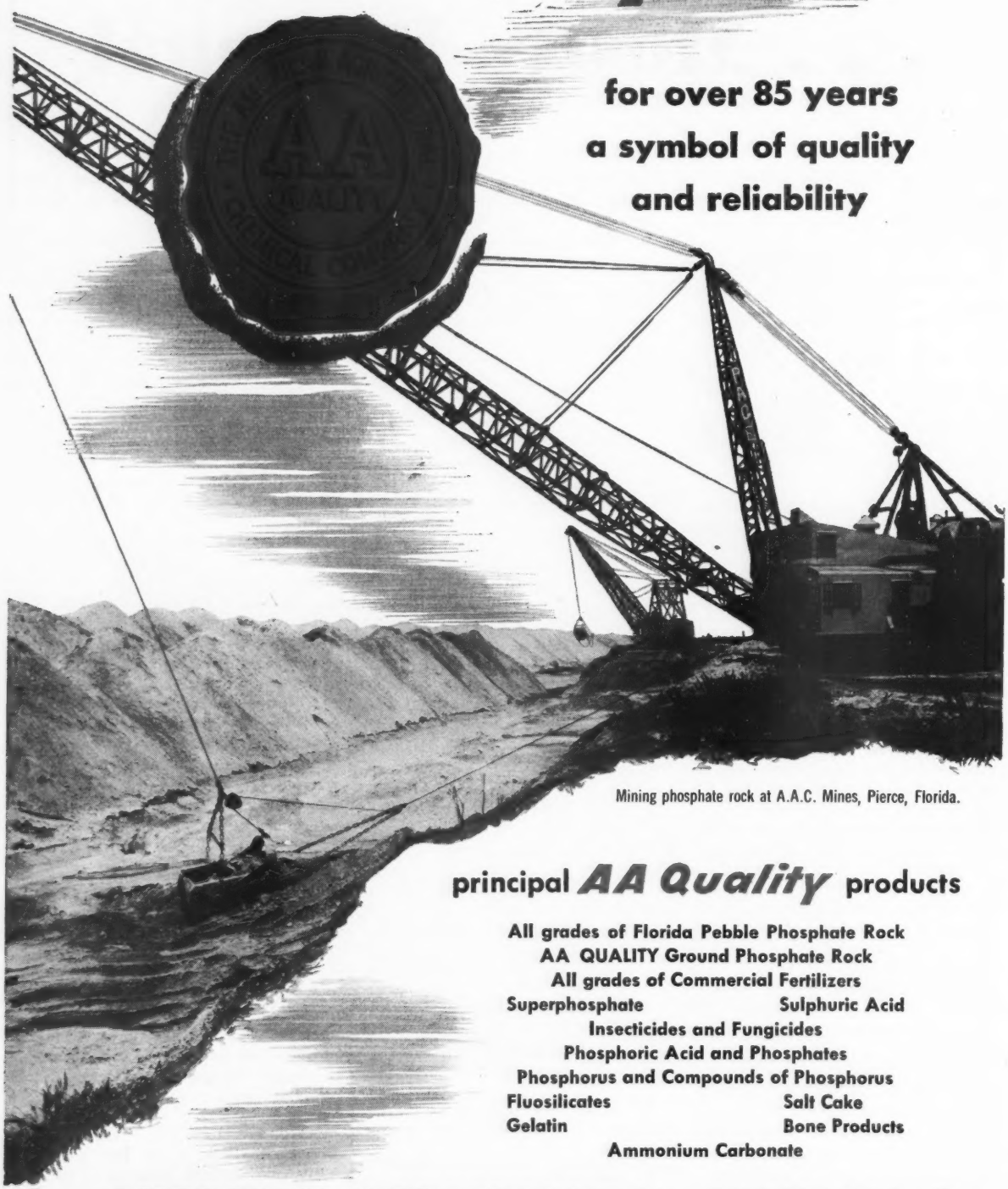

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Farm Chemicals

Washington Report

By Fred Bailey & John Harms

Legislation to set up pesticidal residue tolerances permitted on foods moving interstate is given a better than 50-50 chance for passage. . . . as Congress comes back to Washington this month. Congressmen we've consulted believe the Miller Bill, which would establish tolerance procedure, can be passed this year.

Reasons why Miller bill draws little more than 50-50 odds: Congress is faced with a mountain of other issues during this important election year. The administration still must make its record . . . to be traded off for votes in November. Legislators who want to be re-elected, and this means all members of the House and many in the Senate, are gunning for a quickie session . . . itch to get out on the stump.

This suggests that congressional leaders may concentrate on issues such as farm laws, communism in government, taxes, foreign policy, business conditions and government spending. Legislation considered by the leaders to lack political significance may have to await quieter times.

Residue Tolerance Holdup

There now are indications that the Food & Drug Administration has decided to hold up issuance of residue tolerances pending outcome of action on the Miller Bill. Agreement between FDA and key congressmen is indicated to hold the FDA tolerance order for more than 100 pesticides . . . already drawn up . . . until Congress shows its intentions. Whether FDA comes out with its order very probably now will depend upon diminishing chances that the Miller bill will be approved this year.

If the Miller bill is not passed . . . you can pretty well count on an FDA order establishing tolerances according to legislative authorization already on the books.

High-powered industry talk against any lowering of tariffs on chemical imports has shaken some key officials in Washington who follow the gospel of "trade not aid" down the line. Unexpected industry objection to any proposals for tariff cutting in the industry is getting unofficial credit for heading off possible steam-roller tactics in Congress. It's not that objections weren't expected . . . but that they came so soon and so violent, according to insiders here.

Political forecasters now are saying that Congress will not willingly disrupt present chemical tariff set-ups. They believe the "sensitivity" of the industry to such overtures may be enough to keep such proposals from getting off the ground.

More Industry 'Pressure' Needed

It is apparent, however, that proposals to cut chemical tariffs, and thus open the door to bulk shipments from Europe, may still be made. Need for further industry "pressure" seems to be indicated.

Outlook now is that Congress will use the entire six months remaining before the Reciprocal Trade Agreements act expires to hammer out what is widely touted as a new approach to foreign trade. The act expires in June.

Steps credited with jarring low-tariff thinkers here are these:

(1) Resignation of Monsanto Chemical Co. from the National Association of

Manufacturers. This came about because of an alleged NAM drift toward endorsing tariff cuts.

(2) Persuasive brief filed by the Manufacturing Chemists Association with the Randall Commission . . . which is studying the whole gamut of foreign trade and whose recommendations will have much weight with Congress.

(3) Synthetic Organic Chemicals Manufacturers Association $150,000 study on effects of lower tariffs requested specifically by the Randall Commission. SOCMA's report, made largely by independent specialists and authorities, is expected to have "tremendous effect" on the Commission.

Lower Tariffs Believed Near Fatal

The belief of the synthetic organic chemical industry . . . stated in blunt terms in the report . . . is that lowered tariffs would deal a near-fatal blow to an industry that has played a large role in U. S. economic and technical advancement. SOCMA warns that tariff cuts would dislocate major sections of the industry with the effect of forcing curtailment of its vast research program, seriously reduce production, kill expansion plans, cause wage declines and eventual labor lay-offs, etc.

SOCMA points out that foreign labor costs amount to only 1/10 to 1/4 of the U. S. organic industry wage scale. Generally higher American scale of costs, the report says, means U. S. companies must invest more capital in plants, equipment and research than is necessary for similar operations abroad.

Continued Protection Called For

It is significant to note that the chemical industry is one of the few major enterprises calling for continued adequate tariff protection. It is perhaps doubly significant, trade officials here point out, that while other high-tariff industries generally are smaller enterprises with limited scope, the chemical industry has demonstrated a remarkable growth facility and needs continued protection if the U. S. is to continue self-sufficient chemical-wise.

Agriculture Secretary Benson's new farm program appears ill-fated before it is formally presented to Congress.

Farm-state congressmen are letting it be known that they intend to continue the present high-price support program for at least two more years . . . 1955 and 1956. This, they say, is based on their understanding of farmers' desires arrived at through results of the House Agriculture Committee tour of the country and their own surveys of farm needs.

Benson will advise Congress that the new farm program should be based primarily on flexible price support. Under this, supports would drop during surplus periods and move higher when increased production is needed.

Benson May Compromise

Latest word from inside USDA, however, is that Benson is set to compromise . . . won't press all-out for what he wants. He now reportedly feels he can do agriculture more good if he stays on as Secretary . . . not make an issue of price supports to the extent that he may be forced to quit.

Secretary Benson meanwhile has set out to sell himself to farmers and Congress . . . something which top Republican strategists say he has failed to do so far. To do this, he has begun to surround himself with former farm state newsmen and a few political fire-brands who could be expected to guide him in Congressional dealings as well as keep him alert to farmer thinking.

New method for measuring phosphate needs of soils has been worked out by Agriculture Department and the Colorado Experiment Station. The test involves use of ordinary baking soda to dissolve phosphorus from a soil sample. Results reveal "how crops grown on a given soil are likely to respond to added phosphate." Reportedly quick and simple, the method is also said to be "especially valuable for testing the neutral and alkaline soils common in the West."

Pesticide Manufacturers:

Were You In the Black in '53?

Farm Chemicals gets answers to that and other questions in a special questionnaire

By Hamilton C. Carson
Managing Editor

PROFITS in the pesticide industry didn't vanish for a majority of companies last year, despite the moans and long faces which were so evident at trade conventions.

At least three-fifths of the companies in the industry stayed in the black despite large inventories, price-cutting and the economic difficulties suffered by many farmers.

It should be noted that these percentages were developed only on the basis of replies to the questionnaire, which was circulated to a limited number of companies in most areas of the country. The survey, of course, cannot be considered conclusive, because of its limited scope.

Although most personnel agreed that the profit picture in the industry should have been a lot better, considering the risks involved and the volume of sales, 59 per cent declared they were in the black in 1952. The other 41 per cent said they used red ink in their ledgers and gave a variety of reasons for the bad season.

Inventories Better

In answer to other questions, industry leaders replying to the questionnaire reported that their inventory situation had been improved and that they looked for price rises in DDT, BHC and certain other chemicals next year.

But, although most replies to the survey were distinctly pessimistic, slightly less than half of the companies replying said they were taking any new steps to counter the poor profit picture.

In clarifying the percentages, it should be pointed out that many of the persons answering "no" to question No. 1 said their companies just barely finished in the black last year.

And some, in answering question No. 4, said they would continue "determined selling efforts," or made similar comments.

Not So Bleak

The survey indicates that the past season was not as bleak as had been indicated. Answers to questions No. 2 and 3 indicate, too, that there is a certain guarded optimism among industry members concerning the inventory and price situations.

Here are the four questions in the FARM CHEMICALS letter, and some typical answers:

1. Arthur W. Mohr, retiring president of the National Agricultural Chemicals Association, commented at the annual NAC convention in September that with increased costs and decreased selling prices in the pesticide industry "profits have vanished." Was this the case with your company in the 1953 season?

W. G. Hewitt, president, Pacific Guano Co., Berkeley, Cal.—In our case I cannot say that profits have entirely vanished. Certainly the trends noted by Mr. Mohr were evident in our case during the past season, but the squeeze was not sufficient to eliminate entirely the profitableness of this part of our business. Profits were not as high as in 1952, but we were still well in the black.

R. V. Kerley, Southwest Fertilizer & Chemical Co., El Paso, Tex.— . . . the profits have vanished as far as we can tell, not only from our own phase of the insecticide business as grinders and formulators, but, if we can believe our suppliers, and I think we can, there is little or no profit in it for them. We handled considerable tonnage of insecticide this season but figure that we did not make anything and possibly did lose a little.

Frank B. Stewart, Miller Products Co., Portland, Ore.—We concur with Mr. Mohr in that profits are at a minimum and have vanished in relation to certain key chemicals.

J. V. Vernon, president, Niagara Chemical division, Middleport, N. Y.—Yes, I thoroughly agree with Mr. Mohr's statement.

Percentage Down

S. W. Martin, Yakima Valley Spray Co., Yakima, Wash.—In our experience, profits have not entirely vanished, but the percentage of profit to gross sales has become somewhat out of line. This past year we developed approximately 10 per cent more gross sales and realized approximately 10 per cent less in net profits therefrom.

F. M. Feffer, president, Arizona Fertilizers, Inc., Phoenix, Ariz.—While our profits didn't "vanish" they are substantially reduced mainly because of decreased selling prices, increased costs of manufacture and very light infestations.

This year for the first time we had more "chiseling" and ruinous selling practices by several out of state companies who, because of their heavy inventories and the urgency, probably, to liquidate, came in and sold in a number of instances below cost.

L. A. Brown, president, AGSCO Chemicals, Inc., Grand Forks, N.D. —Our profit picture on pesticides leveled out the past two seasons after taking a substantial dip in 1950 and 1951.

H. A. Woodbury, president, Woodbury Chemical Co., St. Joseph, Mo.—No.

W. Newton Long, president, Miller Chemical & Fertilizer Corp., Baltimore, Md.—The 1953 season has been "fair" only from the profit viewpoint. Although many items have been sold at cost figures or less, yet the general situation would be classed as "fair" and *not* "disastrous."

Samuel Marshall, Central Chemical Corp., Hagerstown, Md. —I agree with Mr. Mohr, that with the increased costs and decreased selling prices, "profits have vanished."

J. B. Haviland, president, Haviland Agricultural Chemical Co., Grand Rapids, Mich.—Not exactly, but profits are getting harder to realize each year.

'Very Poor'

P. H. Clute, AGCO Agricultural Products Co., Anthony, N.M. —I would describe our operations in the pesticide portion of our business during 1953 as very poor, not fair and not disastrous. Sales were extremely slow due to the prime factor of not having any appreciable insect population in our area to combat on a large scale. It appeared at times during the season that something would develop but generally speaking predatory insects took care of the situation.

R. S. Thompson, Thompson-Hayward Chemical Co., Kansas City, Mo.—During the 1953 season we managed to maintain a modest profit on pesticide sales by deemphasis of cotton poisons and increased emphasis on sales of specialty pesticide products, particularly packaged products and our weed killer line. Profits on pesticide sales in 1953 were slightly better than in 1952 although the profits in both years were substantially less than previous years and are too narrow for the risk involved.

Question	Yes	No
	%	%
1. Did profits vanish?	41	59
2. Inventories improved?	84	16
3. Will prices rise?	57	43
4. Is your company doing anything new to improve profits?	48	52

Several other companies in the farm chemicals industry replied to the questionnaire, but requested that their names be withheld. Some of the quotes from these replies follow:

It is true that decreased selling prices during 1953 together with increased costs caused a serious decline in the profit margin on all agricultural chemicals. In many instances these items went to the place where they were at a loss rather than a profit. We have tried to eliminate as many of these non-profitable items as possible.

* * *

During the past season, the competitive prices in the Rocky Mountain area were responsible for decreased profits and, as a result, our company suffered a small loss.

* * *

Mr. Mohr's comments regarding increased costs and decreased selling prices are thoroughly justified as applied to large segments of the agricultural insecticide field during 1953. If we failed to suffer from the situation it is only because we were not in those segments of the field most severely affected.

* * *

Our profits for the 1953 season very nearly vanished, due to overproduction in the industry, along with poor selling and price cutting.

* * *

. . . our operations for the past season were in the black, however, profit margins continued to decline as they did in the previous year and the net profit on sales and the net return on equity funds, plus surplus, was the lowest that this company has ever experienced.

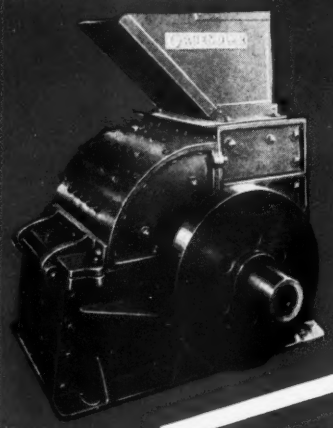
* * *

We agree with Mr. Mohr. We would not describe the situation as disastrous but we would certainly agree that it was extremely unsatisfactory.

* * *

We agree with Mr. Mohr's statement that profits vanished during the 1953 season. It certainly did with our company and

(Continued on page 62)



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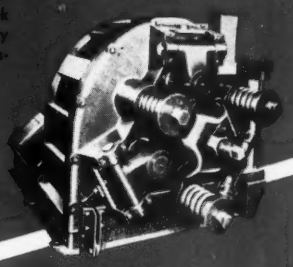

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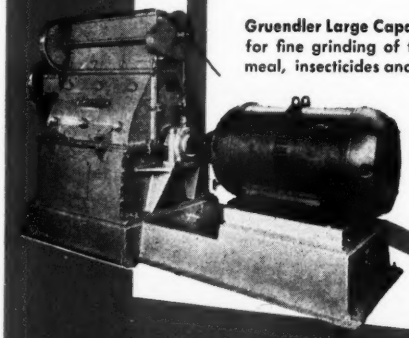
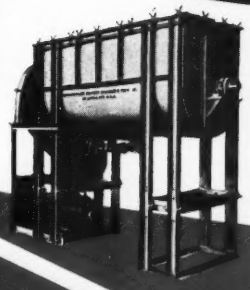


Gruendler Large Capacity 4040 "Aristocrat" for fine grinding of fertilizer, tailings, fish meal, insecticides and many other products.

Ribbon or Combination Ribbon and Paddle Mixers for urea, fertilizer ingredients, insecticides and other compounds requiring blending.



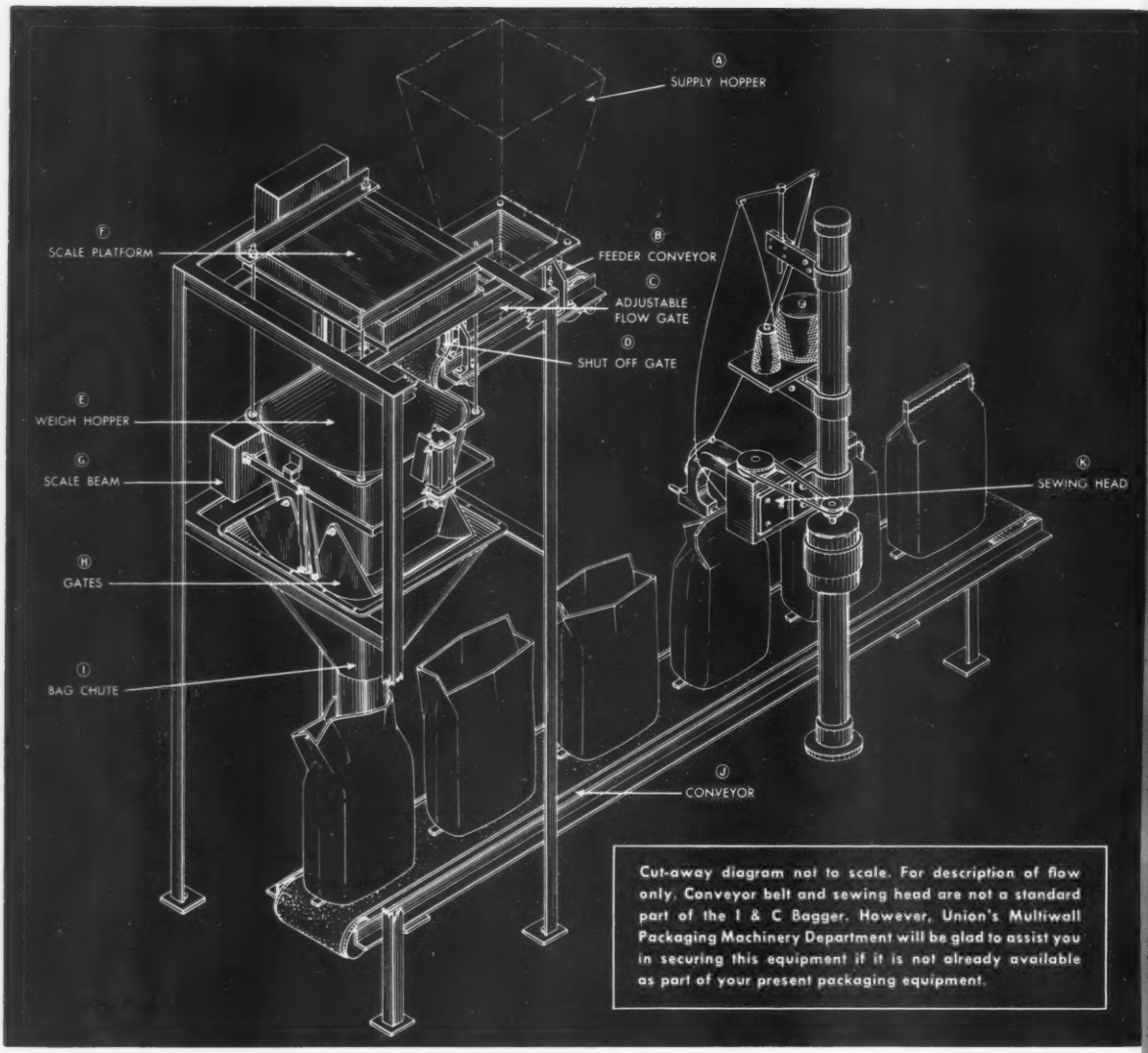
Gruendler Double Paddle Mixers, available in either regular or stainless steel, for continuous mixing, blending and acidulating.

The Gruendler Crusher & Pulverizer Company also manufactures elevators, vibrating screens, clod breakers and other equipment for Fertilizer and Insecticide mixing plants. Write for information . . . no obligation.

WRITE TO **GRUENDLER CRUSHER & PULVERIZER CO.** SINCE 1885

DEPT. F-1 • 2915 N. MARKET STREET • ST. LOUIS 6, MO.

NOW! UNION BAG OFFERS


A SUPPLY HOPPER
F SCALE PLATFORM
B FEEDER CONVEYOR
C ADJUSTABLE FLOW GATE
D SHUT OFF GATE
E WEIGH HOPPER
G SCALE BEAM
K SEWING HEAD
H GATES
I BAG CHUTE
J CONVEYOR
Cut-away diagram not to scale. For description of flow only. Conveyor belt and sewing head are not a standard part of the I & C Bagger. However, Union's Multiwall Packaging Machinery Department will be glad to assist you in securing this equipment if it is not already available as part of your present packaging equipment.

OPERATION IS SIMPLE AND PRACTICALLY FOOL-PROOF

MATERIAL to be packaged flows from supply hopper (A) to feeder conveyor (B) which carries material to weigh hopper (E). Adjustable flow gate [located at (C) but not shown] regulates amount of material which feeder conveyor carries. This controls speed of filling cycle.

Weigh hopper (E) is suspended from scale platform (F). When material fed into weigh hopper reaches weight set on scale, the scale platform actuates scale beam located in box (G).

Scale beam sets off a system of synchronized switches which stop the feeder conveyor (B), lower a shut off gate [located at (D) but not shown] on the weigh hopper end of the feeder conveyor. This prevents any excess material from dribbling into weigh hopper, insuring accurate weight. Switch also opens gates (H) at bottom of weigh hopper. Pre-weighed material drops through filling spout (I) into bag.

With weight removed from scale, scale beam (G) now actuates synchronized switches in reverse order. Simultaneously gates (H) to weigh hopper (E) close . . . shut off gate (D) raises . . . and feeder conveyor (B) starts up and begins next filling cycle.

Bag is held on filling spout (I) by hand. As material drops quickly through spout into bag, filled bag drops onto a moving conveyor belt (J). This belt carries bag through sewing head (K) to complete packaging cycle.

I&C Bagger

Automatic Weighing and Filling Machine for Open Mouth Bags

FASTEST AUTOMATIC BAGGER

MUCH-DISCUSSED I & C BAGGER WEIGHS AND PACKS FREE-FLOWING, NON-BRIDGING MATERIALS AT SPEEDS UP TO 20 100-LB. MULTIWALLS A MINUTE!

DOLLAR FOR DOLLAR, the new Inglett & Corley Bagger, sold exclusively by Union Bag, is the most efficient and practical unit for accurate, high speed weighing and packing of free-flowing, non-bridging materials.

The I & C Bagger processes 400 to 500 tons in an eight hour day. Its filling and weighing cycle is completely automatic. Weight tolerance is close: in continuous runs, the machine can and does pack to within 4 ounces per 100 lb. bag.

LOWEST COST AUTOMATIC OPEN MOUTH BAGGER

Total cost of the I & C Bagger, with conveyor and sewing head, is more than 25 per cent below any comparable unit, and the I & C has a packing rate 25 per cent greater than any other open mouth packer.

WORKS WELL WITH ALL SIZES OF OPEN MOUTH BAGS

Changeover from one weight to another takes only the few minutes needed to change the scale beam balance. The I & C Bagger handles any open mouth bag, paper or textile, from 10 through 200 lb. weights.

NEEDS ONLY TWO OPERATORS

The I & C Bagger pre-weighs and packs with only one operator plus another man on the sewing equipment. Unskilled labor can be used; men require a minimum of training and supervision.

INSTALLED AND OPERATING IN TWO DAYS OR LESS!

Only 5′ x 5′ floor space, 8′ headroom over conveyor needed. Factory trained personnel will make installation, if desired, at actual cost.

DELIVERY PRIORITIES BASED ON RECEIPT OF ORDER

For quickest possible delivery, consult a Union Packaging Specialist now. Union can also advise you on plant layout and on whatever supplementary packaging machinery you may require.

HIGHER PRODUCTION . . . LOWER COSTS . . . LESS DOWN TIME . . .

Ask to see the impressive performance records the new I & C Bagger already has established in daily field use. Production jumps. Labor costs drop sharply. Down time is slashed.

Make your own comparison with any other packer. Verify for yourself that Union's I & C Bagger is more economical initially—cheaper to install—less expensive to maintain.

Manufactured by
INGLETT & CORLEY, INC., AUGUSTA, GA.
Exclusive sales agents:

Union Bag & Paper Corporation

Woolworth Building, New York 7, N. Y.

MULTIWALL PACKAGING MACHINERY DEPARTMENT

Florida Makes Plant Pay Off

with mechanization, automatic operation

ONE OF the most modern small fertilizer plants in the nation. That's the claim of Florida East Coast Fertilizer Co. after a recent extensive modernization program.

The company, located in Homestead, installed an up-to-date line of automatic fertilizer equipment. When mechanization was completed, hand labor at the unit virtually was eliminated.

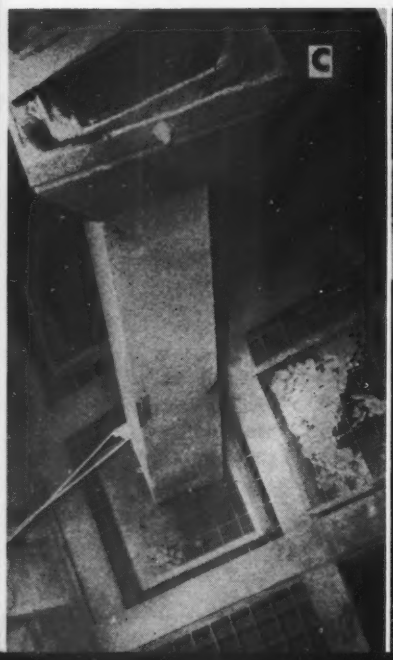
Florida East Coast cites three factors which influenced it in starting a three-year modernization program in 1950: greater sales volume, increased labor cost and price competition.

According to Henry Pridgen, manager of F.E.C., improvements completed this year provide in their designs for future possibilities of the sale of bulk fertilizer.

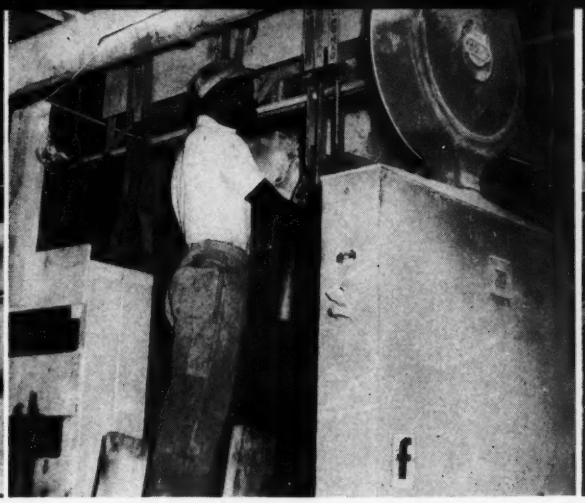
"The changes have been made with the view of giving our customers better service at a better price without sacrifice of quality," Pridgen stated. He added that they will insure the company's continued operation in the face of increased competition.

Typical of the modernization was the installation of Hough Payloaders (**a**) for handling bulk fertilizer materials and filling the batching elevator.

Important in the revamped setup is the batching elevator, which delivers materials for processing. Photo (**b**) shows elevator head and clod breaker with gimbal mounted delivery chute to batching bins.

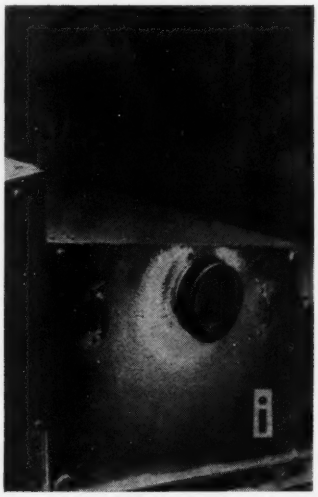


F.E.C. credits its new Davidson-Kennedy Batching Machine Hoppers for upping efficiency. Delivery chute, screens on top of hoppers are shown in (**c**) while Roland Reincke, plant superintendent, supervises filling of hoppers in (**d**).

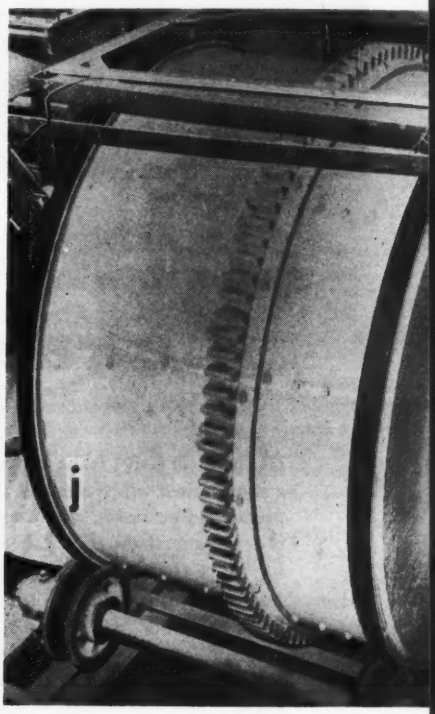


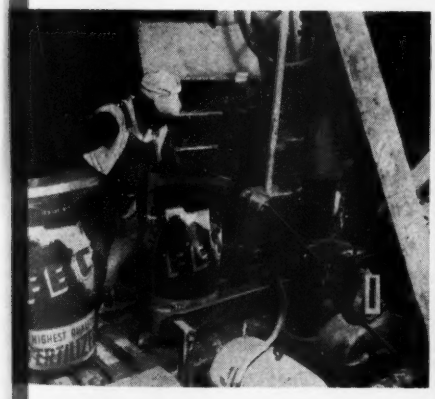
Weigh-hopper has a cluster of batching bin spouts above it (**e**). The weigh-hopper is filled by operator (**f**) who is part of the greatly decreased labor force now needed by the company.

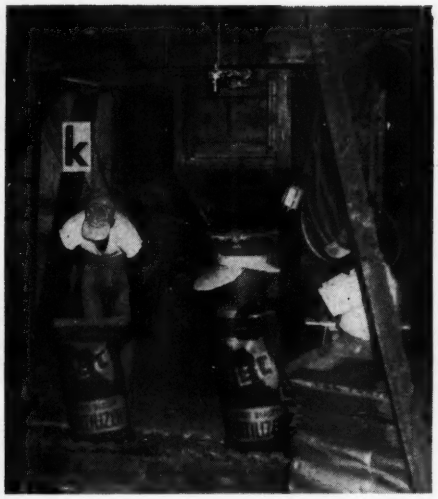
After the weigh-hopper has been filled, a conveyor carries it further on and dumps it into the mill elevator (**g**). The batch is carried up to the mill elevator head and motor drive (**h**) where it is delivered to a Davidson-Kennedy combination hammermill screen (**i**). An integral part of the Florida East Coast modernization is the mammoth 2,000-pound mixer (**j**) where the batch of material goes after passing through the screen.



Inglett and Corley automatic bagging unit (**k**) gives maximum utilization of increased production by its automatic control of bag filling. Unit is distributed by Union Bag and Paper Corp.







Union Special sewing machine (**l**) is used to stitch bags, which are loaded into hand trucks (**m**) then to customers' trucks. F.E.C. uses flow meter ammoniation to speed up basing, a high speed "slinger" to make cooler base material and an electric car spotter in redesigned plant. ◆

DIAMOND K-101

KILLS THIS DESTROYER OF FRUITS

DIAMOND K-101 is the miticide which has proven so effective against mites which destroy citrus and grape crops . . . figs, plums and prunes . . . peaches and a wide variety of nuts. Its potent residual and ovacidal actions control these damage-causing pests at their source.

DIAMOND K-101 (p-chlorophenyl p-chlorobenzene sulfonate) is a mite specific and is effective against a long list of spider mites including: European Red, Citrus Red, Atlantic, Pacific, Willamette, Six-Spotted, Two-Spotted, Brown Almond and Clover mites.

For technical assistance, delivery and price data, contact DIAMOND—one of the basic producers of insecticides and herbicides.

DIAMOND AGRICULTURAL CHEMICALS

- DDT
- BHC
- LINDANE
- MITICIDE K-101
- HEXACHLOROBENZENE
- 2,4-D Weed Killers
- 2,4,5-T Brush Killers

and many other chemicals that help farmers, gardeners, cattlemen and orchardists.

DIAMOND ALKALI COMPANY

Organic Chemicals Division

80 LISTER AVE., NEWARK 5, N. J. • Plants: Newark, N. J. and Houston, Tex.

DIAMOND ALKALI CHEMICALS

In farm chemicals products, here's

What Was New In '53

DURING the past year a number of important new products were introduced to the farm chemicals industry, among them several versatile pesticides.

To provide an accurate summary of these materials, FARM CHEMICALS contacted a large number of producers for information on their introductions. Data received from these companies, plus information gathered during 1953, have been included in the following columns.

It should be pointed out that omissions undoubtedly have occurred. Some companies did not respond to the inquiry and we were unable to obtain information on their products from other sources.

For those who are interested in contacting producers of any chemicals, a list of the companies represented, with complete address, follows the product listings.

Conditioning Agents

NACCONOL. National Analine Div.

Chemical Name: Alkyl aryl sodium sulfonate. **Uses:** Mixed fertilizer, superphosphate, flotation agent (phosphate rock), wettable powders, emulsions (DDT, etc.). **Availability:** Commercial quantities in flake, bead, granular, powder or liquid form. Several concentrations.

TERGITOL DISPERSANT NPX. Carbide & Carbon Chem. Co.

Chemical Name: Alkyl aryl polyethylene glycol ether. **Uses:** Processing aid in production of superphosphates. Soluble and stable in concentrated sulfuric and phosphoric acids. Added to acid at rates of ¼ to ½ pound per ton of finished super. **Availability:** Commercial quantities.

UDET 90-95F & UDET 50F. Universal Detergents, Inc.

Chemical Name: Anionic alkyl aryl sodium sulfonate. UDET 90-95F is a free-flowing granular powder and UDET 50F a homogeneous free-flowing liquid. **Uses:** In fertilizer production during sulfonation, ammoniation and granulation operations and also in dry-mixing as an anti-caking agent. In the insecticide industry it has application as a wetting agent and dispersant. **Availability:** Commercial quantities.

Defoliants

ALPHENOL. Pioneer Chemical Associates.

Description: Mixture of alkyl phenols combined with pentachlorophenol. **Uses:** Major use to date as a defoliant for cotton, soybeans and potatoes. Usage increasing on alfalfa, clover and corn. **Availability:** Commercial quantities in three formations: Alphenol 90 Cotton Defoliant (oil soluble conc.); Alphenol 90 Soybean Defoliant (oil-soluble conc.) and Alphenol 90 General Defoliant (diluted with water and oil or water alone).

PERMAGARD DEFOLIANT CONCENTRATE. Thompson Hayward Chem. Co.

Description: Defoliant based on pentachlorophenol plus activating solvents. Developed for pre-harvest use on cotton at one to two quarts per acre in three to five gallons of oil.

Diluents

AMERICAN BRAND VERMICULITE (GLITTER). American Vermiculite Corp.

Description: Aluminum magnesium silicate; an expanded and graded form of altered mica. **Uses:** An absorbent carrier in spray pesticides; to prevent caking and soak hardening of fertilizers; as a starting medium and soil lightener. **Availability:** Commercial and experimental quantities from Eastern plants.

COC DILUENT. Calcium Carbonate Co.

Description: Calcium carbonate product compatible with most insecticides. Has good dusting properties, acts as a grinding aid in processing DDT and other toxicants with absorbent diluents. Conditions formulations to prevent packing and lumping in storage.

SEMINOLE PRETREATED ALUMINUM SILICATE. Southern Clays, Inc.

Description: Insecticide carrier. Features low viscosity in water at 60 per cent solids without addition of wetting agents. Water washed, non-abrasive with uniform *p*H.

SER-X. Summit Mining Corp.

Description: Insecticide diluent with neutral *p*H and good drift control properties.

SPECIAL DISPERSIBLE FLOREX & CALCINED FLOREX. Floridin Co.

Description: Fullers Earth products. Used in experimental and commercial applications for soil pest control and as a base for the addition of insecticides to fertilizers. **Uses:** Formulations of insecticides for use as soil pesticides, addition of insecticides to fertilizers, formulations of insecticides for mosquito control. **Availability:** Experimental and commercial quantities. A definite preference has been noted for the 30/60 and 16/30 mesh classifications. Availability in a variety of mesh classifications and in two grades. Special classifications tailored to customer specifications.

Emulsifiers

AGENT OC-O-158. Antara Chemicals Div.

Description: Nonionic type, essentially 100 per cent alkyl phenoxy polyoxyethylene ethanol. **Uses:** May be useful as a co-solvent and emulsion stabilizer, also as an anti-foaming agent in combination with

The two Greatest Insecticide Successes since DDT

aldrin

IN JUST A FEW SHORT YEARS aldrin has established an outstanding insecticide record. Its fast action against major crop pests has protected farm production and its low cost has meant widespread usage on many crops.

Soil Insects

For example, the control of underground insects has now become economically possible with the development of aldrin. Aldrin is unsurpassed for the control of major soil pests.

Here are just a few:

rootworms
wireworms
white grubs
chinch bugs
green June beetle larvae
European chafer grubs
sugar beet maggots
Japanese beetle larvae

Grasshoppers:

From the test tube on, aldrin has been the international "hopper-stopper." Whether halting the attacks of these voracious crop-eaters in North America or ending the famines caused by its cousin, the locust, in the Middle East, nothing approaches the incredible 99% control of just *ounces* of aldrin *per acre.*

Cotton Insects

And aldrin has been a boon to King Cotton! Its fast and low-cost control of the boll weevil has boosted yields and profits for thousands of growers.

dieldrin

Dieldrin leads the parade of those organic insecticides which have long residual action. And it controls a very wide variety of insects. For that reason, dieldrin is a fine stock item to meet the needs of growers *around the year.* Here are a few examples of dieldrin's versatility:

Cotton boll weevil · thrips cutworms · plant bugs	**Turf Insects** ants · Japanese beetle larvae white grubs · chinch bugs
Public Health Pests houseflies · mosquitoes fleas · ticks	**Vegetables** tuber flea beetles · leaf miners onion thrips · root maggots
Fruit plum curculio "catfacing" insects	**Cereal and Forage Crops** armyworms · alfalfa weevil chinch bugs

Aldrin and dieldrin can be formulated into dusts, wettable powders, emulsible concentrates, and granules—all common formulations.

• • •

Their sale is backed by State and Federal recommendations and the finest of technical service. You'll find them good products to recommend to growers in your area.

SHELL CHEMICAL CORPORATION

AGRICULTURAL CHEMICALS DIVISION
CHEMICAL PARTNER OF INDUSTRY AND AGRICULTURE
P. O. BOX 2171, DENVER 1, COLORADO
Atlanta · Houston · Los Angeles · New York
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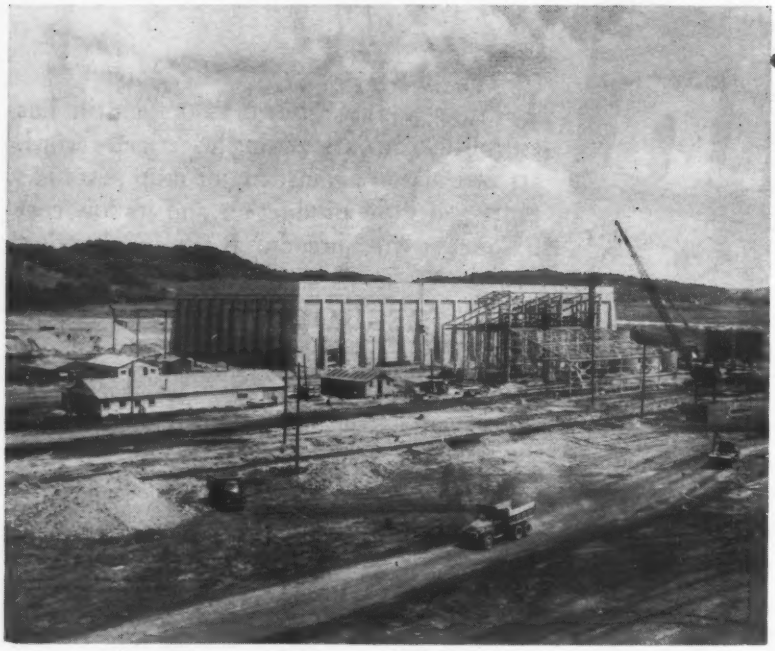

Here's where Nitrogen Division is storing its new complex fertilizer, Arcadian 12-12-12, at South Point, Ohio. See description on this page.

other emulsifiers.

EMCOL H-83A. Emulsol Corp.

Description: Nonionic-anionic blend for emulsification of Toxaphene, Malathion, Chlordane, Toxaphene-DDT. **Availability:** Commercial quantities.

EMCOL H-85A. Emulsol Corp.

Description: Nonionic-anionic blend for emulsification of BHC-DDT, Chlordane, DDT, Endrin, Dieldrin, Dieldrin-DDT, Methoxychlor, DDD. **Availability:** Commercial quantities.

EMCOL H-86. Emulsol Corp.

Description: Nonionic-anionic blend for emulsification of Chloro-IPC. **Availability:** Commercial quantities.

EMCOL H-891. Emulsol Corp.

Description: Nonionic-anionic blend for emulsification of BHC-DDT, BHC- **Availability:** Commercial quantities.

EMULSIFIER 1869. Armour Chemical Div.

Description: Blend of anionic-nonionic surface active agents. Soluble in most aromatic solvents and toxicants, relatively insoluble in kerosene. (The latter insolubility does not deter from solubility in pesticide-solvent mixtures because toxicants exert a mutual solubilizing action on the emulsifier.) **Uses:** Emulsification of Toxaphene, Chlordane, butoxyethanol, propylene glycol, butyl and iso-octyl esters of 2, 4, 5-T and isopropyl ester of 2, 4-D. Also may be used with lindane and DDT with only slight apparent creaming. **Availability:** Commercial quantities.

IGEPAL CO-530. Antara Chemicals Div.

Description: Nonionic type, essentially 100 per cent alkyl phenoxy polyoxyethylene ethanol. **Uses:** Emulsification of Toxaphene, as a coemulsifier when used in combination with other emulsifiers.

IGEPAL CO-610. Antara Chemicals Div.

Description: Nonionic type, essentially 100 per cent alkyl phenoxy polyoxyethylene ethanol. **Uses:** Where a low foaming material is required. Should prove useful in formulation of blended emulsifiers when used in combination with others.

T-H EMULSIFIER C-I. Thompson Hayward Chem. Co.

Description: Emulsifier blend. **Uses:** For emulsification of Chloro-IPC.

T-H EMULSIFIER D-I. Thompson Hayward Chem. Co.

Description: Emulsifier blend. **Uses:** For DDT and BHC formulations. Also has been used with Methoxychlor and Rothane.

T-H EMULSIFIER M-I. Thompson Hayward Chem. Co.

Description: Emulsifier blend. **Uses:** With concentrates containing Lindane, Dieldrin, Aldrin, Heptachlor or other toxicants.

T-H EMULSIFIER W-I. Thompson Hayward Chem. Co.

Description: Emulsifier blend. **Uses:** For Chlordane, Toxaphene, Parathion and esters of 2,4-D and 2,4,5-T. When used with the herbicidal esters it enables dilution of the product with a mixture of oil and water and emulsifies the diluting oil.

TOXIMUL 150. Ninol Laboratories.

Description: Developed for Toxaphene and Toxaphene-DDT mixtures. Features flash emulsification with three per cent emulsifier, effective in hard or soft water, slow creaming rates, no oiling, high storage stability.

TOXIMUL 300 & 400. Ninol Laboratories.

Description: Anionic emulsifiers for polychlor insecticides. Offer flash dispersibility and high stability in both soft and hard waters.

Fertilizers

ARCADIAN 12-12-12. Nitrogen Div.

Description: Complex fertilizer produced by process substituting nitric acid for sulfuric. In pellet form, chemically stabilized during manufacture to prevent caking and screened to eliminate small particles and dust.

HELLER-GRO. Heller Greenhouse Labs.

Description. 15-15-15 fertilizer, important because it is marketed in paste form. Packaged in polyethylene tubes and cans with polyethylene linings for home garden and horticultural applications.

Fumigants

E-D-BEE. American Potash & Chem. Corp.

Description: Ethylene dibromide solution. **Uses:** Wax moth fumigant in bee hives. **Availability:** Commercial quantities.

PLANETARY FUMIGANT. Planetary Chem. Co.

Description: Mixture of ethylene dibromide and methyl bromide possessing low vapor pressure. **Uses:** Grain fumigant.

Fungicides

CAPTAN 50-W. Stauffer Chemical Co.

Description: Contains 50 per cent N-trichloromethyl thio-tetrahydro-phthalimide. **Uses:** Applied alone or in combination with other fungicides on fruit, vegetable and other crops. **Availability:** Introduced commercially in 1953. Microfine wettable powder formulation packed, in 50 lb. drums and in five lb. paper bags, 10 to a carton.

COROMERC. Corona Chem. Div., Pittsburgh Plate Glass Co.

Description: Powdered mercury formulation for control of apple scab. Burns out primary scab lesions if disease takes hold during warm wet spring when other fungicides are unable to check the scab. Recommended for use during early growing season. A dry, granular, water soluble material. **Availability:** Packed in one and 1½ lb. cannisters for direct addition to most spray tanks.

GEIGY SP-50. Geigy Co., Inc.

Description: Seed protectant containing 48 per cent chloranil. Dry wettable powder used dry or with water for alfalfa, small seed legumes, beans, peas, vetch and flax seed.

KARATHANE WP-25. Rohm & Haas Co.

Chemical name: Dinitro capryl phenyl crotonate. **Uses:** Powdery mildew fungicide for fruit, ornamentals, cucurbits and beans. Possesses some acaricidal properties. **Availability:** Commercially available in 1954.

MERCADMINE. H. L. Woudhuysen & Assoc.

Description: Emulgate of five per cent cadmium ricinoleate and five per cent phenyl mercury salicylate. **Uses:** Effective on dollar spot in turf.

MERCULINE. H. L. Woudhuysen & Assoc.

Description: Emulgate of 10 per cent phenyl mercury salicylate. **Uses:** Seed disinfectant showing promise as a protectant and eradicant fungicide for control of seed and soil-borne diseases of vegetable seeds. Has been tested as a fruit spray and for control of flower and turf diseases.

MERCUSOL. H. L. Woudhuysen & Assoc.

Description. Emulgate of 20 per cent copper resinate and two per cent phenyl mercury salicylate. **Uses:** Fungicidal seed treatment applied with slurry treaters, dips, sprinklers or sprayers.

ROBERTSON FUNGICIDE. H. H. Robertson Co.

Description: Fixed copper fungicide with average particle size of two microns. Particles are covered with a coating of regenerative cuprous oxide. Has low phytotoxicity, suspends well, wets easily and provides good dispersion. **Availability:** Commercial.

Herbicides

ALANAP-1. U. S. Rubber Co.

Chemical name: N-1 naphthyl phthalamic acid. **Uses:** Selective herbicide applied as spray to soil or as a contact material. Shows considerable application as a pre-emergence herbicide. **Availability:** Formulated as a wettable powder containing 90 per cent active ingredient. Available during 1953 for use on vine crops only.

DALAPON. Dow Chemical Co.

Active material: alpha, alpha-dichloropropionic acid. **Description:** Selective herbicide exhibiting growth regulator effects. Preliminary studies show it effective and selective with action resembling that of 2, 4-D on broad leaved plants. Expected to have industrial applications initially, until necessary research is completed on farm applications. Has exhibited control of numerous grasses and shows promise for selective control of annual grasses in some broad leaved crops.

KATHON WEED & BRUSH KILLERS (low volatile). Rohm & Haas Co.

Description: Capryl esters of 2, 4-D and 2, 4, 5-T. Low volatile weed and brush control herbicides. **Availability:** Commercial.

A bigger war on weeds of all sorts is being waged in the farm chemicals field with several new herbicides, described on this page

TUMBLE-WEED SOIL STERILANTS. American Potash & Chem. Corp.

Description: Mixture of sodium chlorate and sodium borates. **Uses:** General soil sterilants and weed killers. **Availability:** Commercial quantities in various formulations containing upwards of 20 per cent sodium chlorate.

Insecticides

ALKRON-50D. American Potash & Chem. Corp.

Description: 50 per cent dust base parathion formulation. **Uses:** Prepared especially for dust blenders for preparation of lower concentrate insecticide dusts. **Availability:** Commercial quantities.

ALLETHRIN. Carbide & Carbon Chem. Co.

Chemical name: Alkyl homolog of Cinerin 1. **Use:** As a rapid acting contact poison and knockdown agent in sprays and aerosols used for control of flies and certain other livestock, household and horticultural pests. **Availability:** Commercial quantities.

CHLOROBENZILATE. Geigy Co., Inc.

Description: Acaricide, approved for use on ornamentals.

DIAZINON. Geigy Co., Inc.

Description: Phosphate compound. Laboratory and field tests show it to be an effective fly and barn spray.

HEPTACHLOR. Velsicol Corp.

Chemical name: 1, 4, 5, 6, 7, 8, 8-heptachloro-3a, 4, 7, 7a-tetrahydro 4, 7-methanoindene. **Uses:** Now approved for control of 27 insects on cotton, range grass, alfalfa, potatoes, corn, peanuts, sugar beets and other crops in addition to mosquito adults and larvae and salt marsh sand fly. **Availability:** First used in commercial quantities. Commercial quantities generally available in all sections.

MALATHION. American Cyanamid Co.

Chemical name: 0, 0-dimethyl dithiophosphate of diethyl mercaptosuccinate. **Uses:** Valuable as a home garden insecticide where relative safety to warm-blooded animals is of prime importance. Has a wide range of effectiveness on most common insects and mites. Agricultural uses include control of vegetable and fruit pests. Has been accepted by USDA for fly control inside dairy barns and most other places with the exception of dwelling interiors, milk rooms, on food or feed products or directly on animals. **Availability:** Four per cent dusts and in emulsion form in commercial quantities for farm and fly control use as well as in small package goods.

PERTHANE. Rohm & Haas Co.

Chemical name: Diethyl diphenyl dichloroethane. **Uses:** Insecticide for apple maggot, leafhopper on forage crops, lettuce and others, and as a residual spray for horn fly and lice. Has a very low mammalian toxicity. **Availability:** Experimental. Should be commercially available and registered in 1954.

PYRENONE LARGE SEED PROTECTANT (SLURRY). U. S. Ind. Chem. Co.

Description: Emulsifiable combination of pyrethrins and piperonyl butoxide. **Uses:** Recommended for use on seeds in bulk storage at rate of one pound to 100 bushels of seed. Also used at recommended rate with fungicides with no loss of effectiveness. Slurry mixtures require continuous agitation to insure even distribution. If a fungicide is added, the seed should not be used as food or feed.

(Continued on page 61)

MONTANSALPETER

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26% NITROGEN

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Contains 6½% nitrate nitrogen — quick acting for early, vigorous growth. Contains 19½% ammonia nitrogen — slower acting for sustained growth through to harvest time.

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Pelletized and properly sized for flow.
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2 FERTILIZERS IN 1
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ECONOMICAL SOURCE OF N
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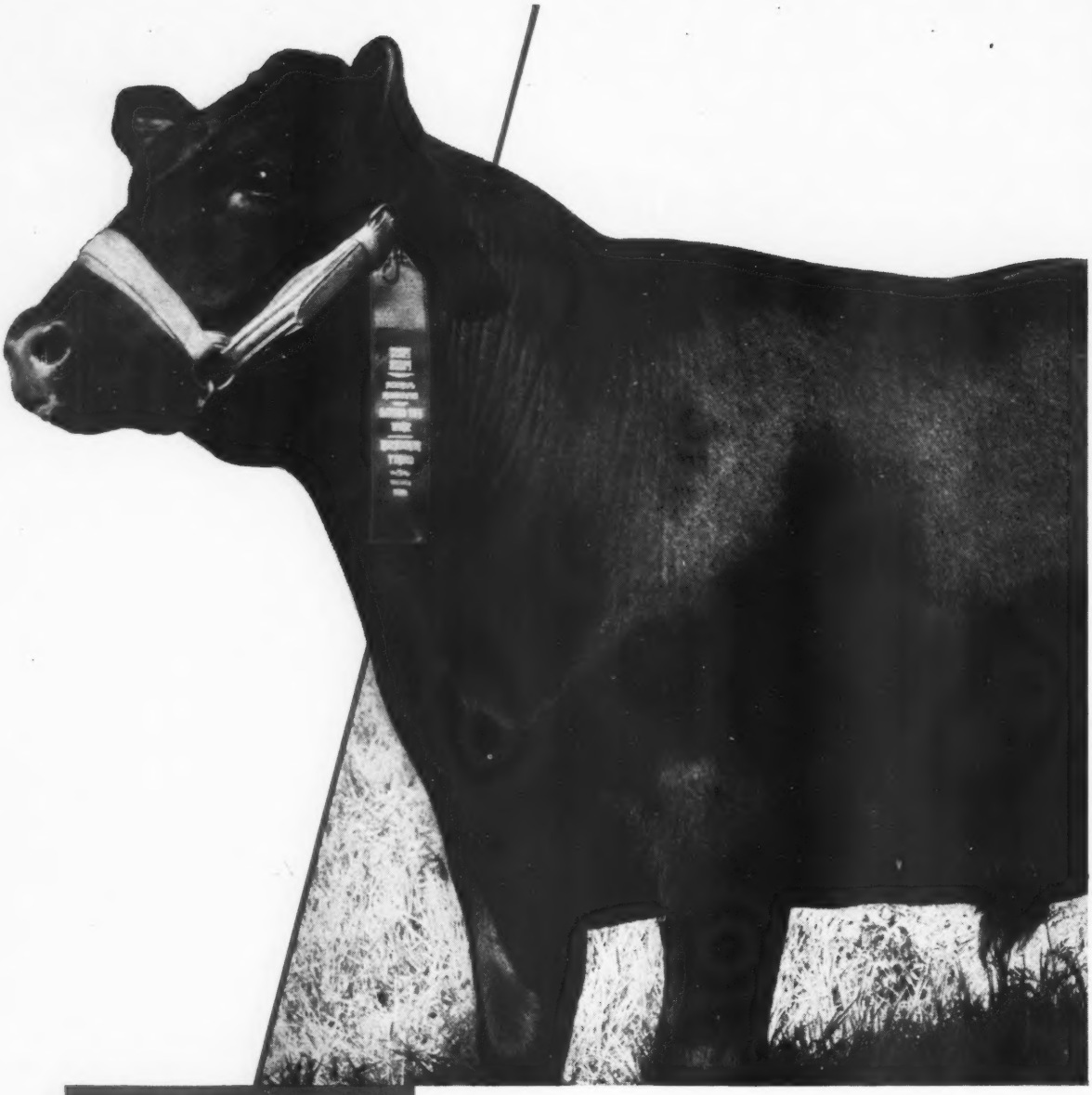

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A prize winner anywhere, this Angus steer has reached prime condition on top grade hay and feeds grown in rich soil.

Soil retains its great natural wealth through the addition of fertilizers, many of them containing potash produced by the United States Potash Company. Potash enriches the soil, improves crop quality, builds resistance to disease, and increases product yield.

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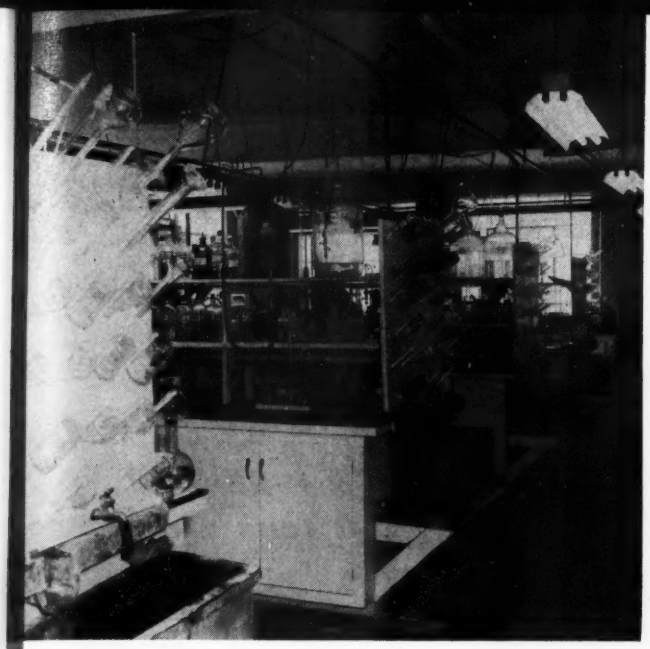
UNITED STATES POTASH COMPANY, INC. 30 ROCKEFELLER PLAZA NEW YORK 20, N. Y.



Michigan Chemical's DDT control laboratory where quality of production is carefully checked.

Michigan Chemical Makes

DDT for the Tropics

A NEW improved 75 per cent DDT wettable powder, manufactured to the most rigid specifications and specially designed to withstand severe conditions of tropical storage and use—is a recent achievement of the research laboratories of Michigan Chemical Corp. of St. Louis, Mich. The company currently is making large shipments of the product to tropical far eastern countries and believes that the new formula also will be an important factor in the domestic market.

First Producer

Michigan Chemical was the first commercial producer of 75 per cent DDT wettable. Its product has consistently met all specifications of the World Health Organization as well as those of governmental, military and private agencies in all parts of the world. The company reports it now is the first to meet new, more stringent requirements.

Malaria Control

Malaria control programs offer one of the most important foreign markets for DDT. Health authorities credit the insecticide with having prevented five million malaria deaths. A year ago, however, American manufacturers were in serious trouble because many DDT powders were losing their suspension properties when stored for periods of time under conditions encountered in hot, humid climates. This was believed to be caused by pressure, heat, moisture or by a combination of these factors.

NAC Steps In

No one knew whether or not it was possible to manufacture 75 per cent DDT wettable that would maintain its physical properties under such adverse conditions, but the National Agricultural Chemicals Association brought the urgent problem to the attention of manufacturers for their consideration.

Intensive Research

DDT formulations have been the subject of continuous and intensive research in Michigan Chemical laboratories since the company began DDT manufacture in 1944. Michigan's formulation chemists attacked the problem with enthusiasm and, as a result, were able to develop a completely satisfactory material.

Michigan Chemical's modern, streamlined formulations are largely the result of the company's acquired skill in grinding and milling DDT. Average particle sizes of one-ten-thousandth of an inch are commonly attained in the finished product.

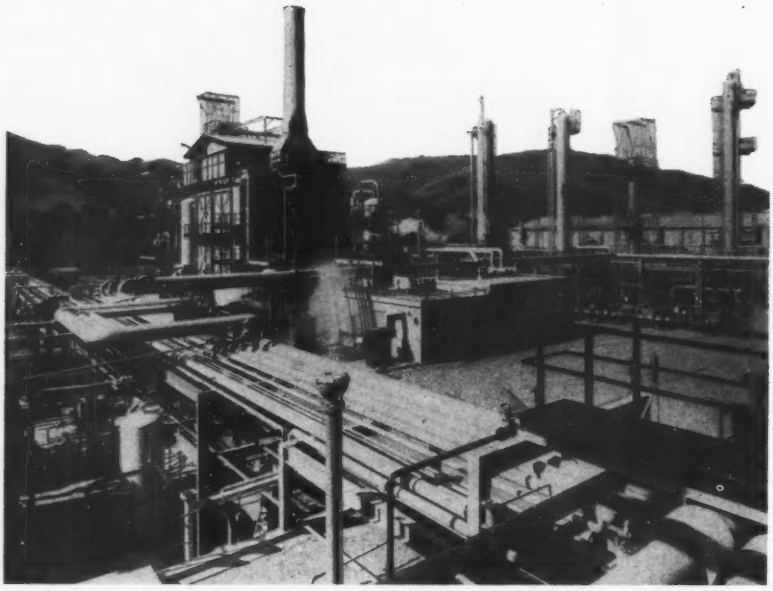
Depression-Born

The company's entry into the DDT field, 10 years ago, is a story in itself and is a good example of what can be done by sheer determination. Wartime materials shortages, lack of outside technical assistance and limited capital—these were all "logical" reasons why the small company should have steered clear of DDT. But Michigan Chemical, a depression-born industry, and its aggressive general manager, John Giles, were accustomed to working under difficulties. Less than six months after the first lab experiment Michigan was in commercial DDT production.

Other Products

Besides DDT insecticides the company also produces bromine and its derivatives, magnesia products, calcium chloride and salt.

Michigan Chemical's board of directors recently elected Theodore Marvin president and chairman of the board. Marvin, an executive of Hercules Powder Co., resigned from Hercules after 30 years' service to direct Michigan's continued development. ◆



Construction of Shell's Ventura plant maintains its position as largest producer of anhydrous ammonia and ammonium sulfate west of Rocky Mts.

It's supplying 150 tons a day

Anhydrous ammonia is becoming more and more an important source of nitrogen for crops. Here worker prepares four-flask injector unit which puts NH_3 in soil directly through a series of small tubes.

Still the leader in the area, Shell uses Ventura plant in

Making More NH_3 For the West

A NEW plant, supplying 150 tons a day of much-needed anhydrous ammonia, has been put in operation by Shell Chemical Corp. in Ventura, Cal.

The plant, which maintains Shell's position as the largest producer of anhydrous ammonia and ammonium sulfate west of the Rockies, was formally opened early last month.

It cost approximately $10,000,000.

Bulk of Shell's ammonia production is earmarked for western agriculture, where ammonia use has risen sharply in recent years. In 1942 the Rocky Mountain and Pacific Coast states used a total of 382,266 tons of fertilizer; in 1952 the figure, for farmers of California alone, was up to 750,000 tons.

The 27-acre plant site is three miles north of downtown Ventura. It was chosen because of the rapidly growing demand for ammonia

fertilizer in California and Arizona and because the Shell Oil Co.'s operations in the Ventura oil field offer an ample supply of natural gas needed in the manufacturing process without interference with other industrial and domestic uses.

Plant Manager

Frank D. Kuenzly, formerly superintendent of Shell's Pittsburg, Cal., plant, which produces anhydrous ammonia, is manager of the new plant, which employs 140 persons.

Kuenzly, a graduate of the University of California at Berkeley, joined Shell in 1934.

R. C. McCurdy, president of Shell, formally opened the plant Dec. 11.

Big Contribution

He said the plant typifies the important contribution made by the chemical industry to the great expansion in America's economy. He noted that the ammonia manufactured at the plant largely will be used as a fertilizer to help support the country's rapidly increasing population.

He added that the Ventura plant also will produce ammonia for use in industry for refrigeration and the manufacture of synthetic fibers, explosives, pulp and nitric acid.

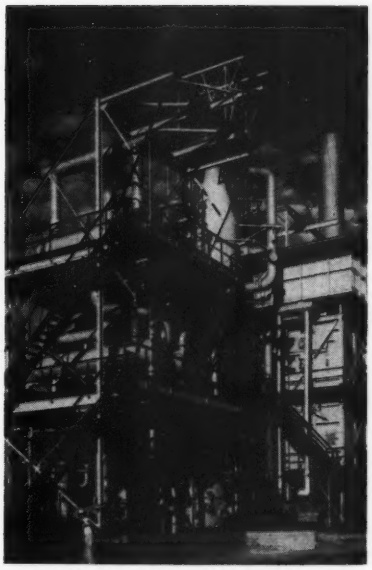
McCurdy declared that the most effective methods of applying ammonia as a fertilizer were first developed by Shell in the thirties and have been widely used since then in other parts of the country.

Shell Services

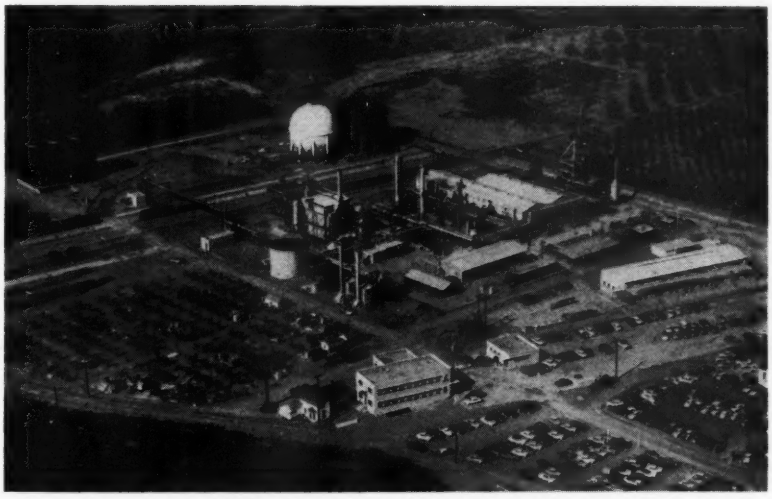
These methods are part of the company's trademarked Nitrogation and Nitrojection services which are respectively methods of transmitting ammonia to the soil through irrigation water and direct injection. Through these services all Shell agricultural ammonia sold to the farmer is applied by trained distributors from company-owned containers.

Since Shell first introduced agricultural NH_3 application of the nitrogen fertilizer has grown tremendously, McCurdy pointed out. He said more than 500,000 successful applications have been made on West Coast farms and ranches. ◆

Photo shows what Nitrogation Ammonia does for crops on West Coast.

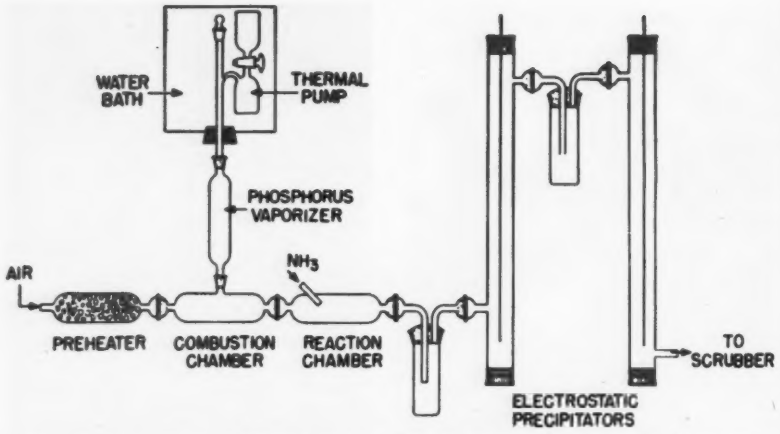


Gas reforming unit at Shell's multi-million dollar Ventura plant.

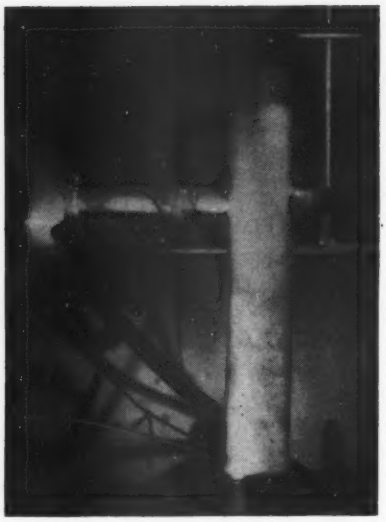


Formal ceremonies, Friday, Dec. 11, marked opening of new ammonia plant. The next day, officials and employes held open-house for Ventura citizens.

This 180-foot building houses a battery of powerful compressors. The three in the foreground, each of 2,000 horsepower, compress synthesis gas.



Phosphorus vapor was burned with preheated air in a combustion chamber in TVA experiments. The resultant phosphoric oxide entered an externally heated reaction chamber, where it met a stream of gaseous ammonia. The final product was collected in traps and electrostatic precipitators. The following reactions are believed to occur in the process: $P_4O_{10} + 4NH_3 = 2PN(OH)_2$ (II) $+ 2NH_4PO_3$(I), $P_4O_{10} + 6NH_3 = 2PNO_2HNH_4$ (III) $+ 2NH_4PO_3$ (I). The product is assumed to be a mixture of ammonium metaphosphate (I), metaphosphimic acid (II), ammonium salt of metaphosphimic acid (III).

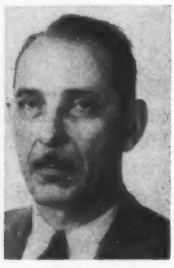


Accumulation of product, foot of electrostatic precipitator.

TVA Fertilizer Has 97% Nutrients

Driskell

Lenfesty



Tarbutton

MORE than twice the plant nourishment provided by some present fertilizer mixtures is contained in a new, superconcentrated fertilizer made from air, phosphorus and ammonia, three Tennessee Valley Authority chemists reported at an American Chemical Society regional conclave in New Orleans last month.

The fertilizer—a white, fluffy powder—contains a total of 97 per cent plant nutrients, according to J. C. Driskell, F. A. Lenfesty and Dr. Grady Tarbutton of TVA's Division of Chemical Development, Wilson Dam, Ala.

The new product was said to be more than twice as concentrated as a mixture of ammonium nitrate and concentrated superphosphate.

Designed to give improved crop response and to be effective over longer periods, it is made by burning phosphorus in air and combining the resulting chemical—phosphoric oxide—with ammonia gas, explained Lenfesty, who presented the report.

Approximately 17 per cent nitrogen and 80 per cent of a phosphorus compound are contained in the new fertilizer, the speaker said.

Testing Results

Small-scale greenhouse tests indicate that the new fertilizer is slightly superior to the nitrate-superphosphate mixture in residual effects.

Tests conducted at the TVA laboratory during the summer showed that the new plant food does not absorb water from the atmosphere under the prevailing conditions of humidity and temperature, Lenfesty continued.

"This is still a laboratory product which has not yet been made on a large scale," he emphasized. "The process, however, has been reproduced consistently in repeated runs in the laboratory.

"Before the material can be completely evaluated, it will be necessary to obtain a sufficient quantity to permit large-scale agronomic testing as well as bag storage and drillability tests. We feel that the process has great promise and that it should be thoroughly investigated on a pilot-plant scale."

In their research, the TVA chemists were seeking to combine phosphorus and nitrogen in a special way to make a compound called a phosphonitrile.

Atoms of phosphorus in such compounds are directly connected to atoms of nitrogen. It was thought that a phosphonitrile would produce a more concentrated nitrogen-phosphorus fertilizer than those commonly in use.

Methods Studied

Several methods of making such compounds were studied and it was determined that the air-phosphorus-ammonia technique was the most effective. Experiments were first done in a small-scale glass apparatus and later in somewhat larger equipment built mostly of stainless steel.

"After a period of exploratory research, a process was evolved which consistently gave a relatively uniform product," Lenfesty said. ◆

What farm chemical salesmen should know about

Getting Along With People

By J. E. Culpepper
General Sales Manager
Spencer Chemical Company

WHEN two or more people work together, problems of human relations arise. Even Adam and Eve in the Garden of Eden had to learn how to get along with each other. That is not always an easy thing to do.

It has been said the problem of getting along with people increases at the rate of the square of the number of people involved. For example, increasing the number of employes in our sales division from 50 to 100 quadruples, rather than doubles, our problem of good human relations.

Intelligent Failures

The same principle, likewise, applies as Spencer enlarges and expands its list of customers. All of us have seen unusually intelligent persons emerge as outstanding failures in meeting the requirements of everyday life. On the other hand, however, we have seen people whom we consider little above morons holding places of honor and great responsibility. This mystery of life presents itself to all of us. What is the answer?

I certainly do not know the answer, of course, but I was sufficiently intrigued with the problem that I expressed a desire to do a little study on the subject. The ability of each of us in our organization to get along with others is becoming more and more important, at an almost alarming rate. When there were 10 of us in the sales division seven years ago, and our customer list was limited to 50 purchasers, our needs on this point were small indeed, compared with our present status of 105 employes serving approximately 1,000 customers. The more I have studied and reflected on the subject the past few weeks, the more I have realized its complexity and importance.

Alfred P. Sloan, chairman of the board of General Motors, once said, "The human problem is far more delicate and difficult to handle than any production problem or distribution problem or engineering problem or financial problem. I have seen men with fine minds who failed to make their plans effective, because they lacked understanding of how to work and get along with people. The ability to get people to work together is of the greatest importance."

Human Problem

This matter of getting along with people is a vitally important question for all, except those very few who intentionally attempt to live the life of a hermit. Perhaps no group of people needs to understand this problem so much as those of us who deal with the public in such capacities as salesmen, agronomists, technical service men, market researchers, traffic experts and advertising copywriters. As a matter of fact, in my opinion, this subject is of practically equal importance to any man who is trying to get ahead in business.

It may help us get this subject in the right perspective if we begin with the premise that every man we meet is a problem in search of a solution. It is up to us to supply the solution. The solution we seek to find will apply equally well, whether the person we are dealing with happens to be a customer, a prospective customer, our boss, a person of equal rank or the people we supervise. Believing this to be true, I am inclined to judge the ability of my associates to get along with customers and prospective customers by how well they relate themselves to and get along with their close associates.

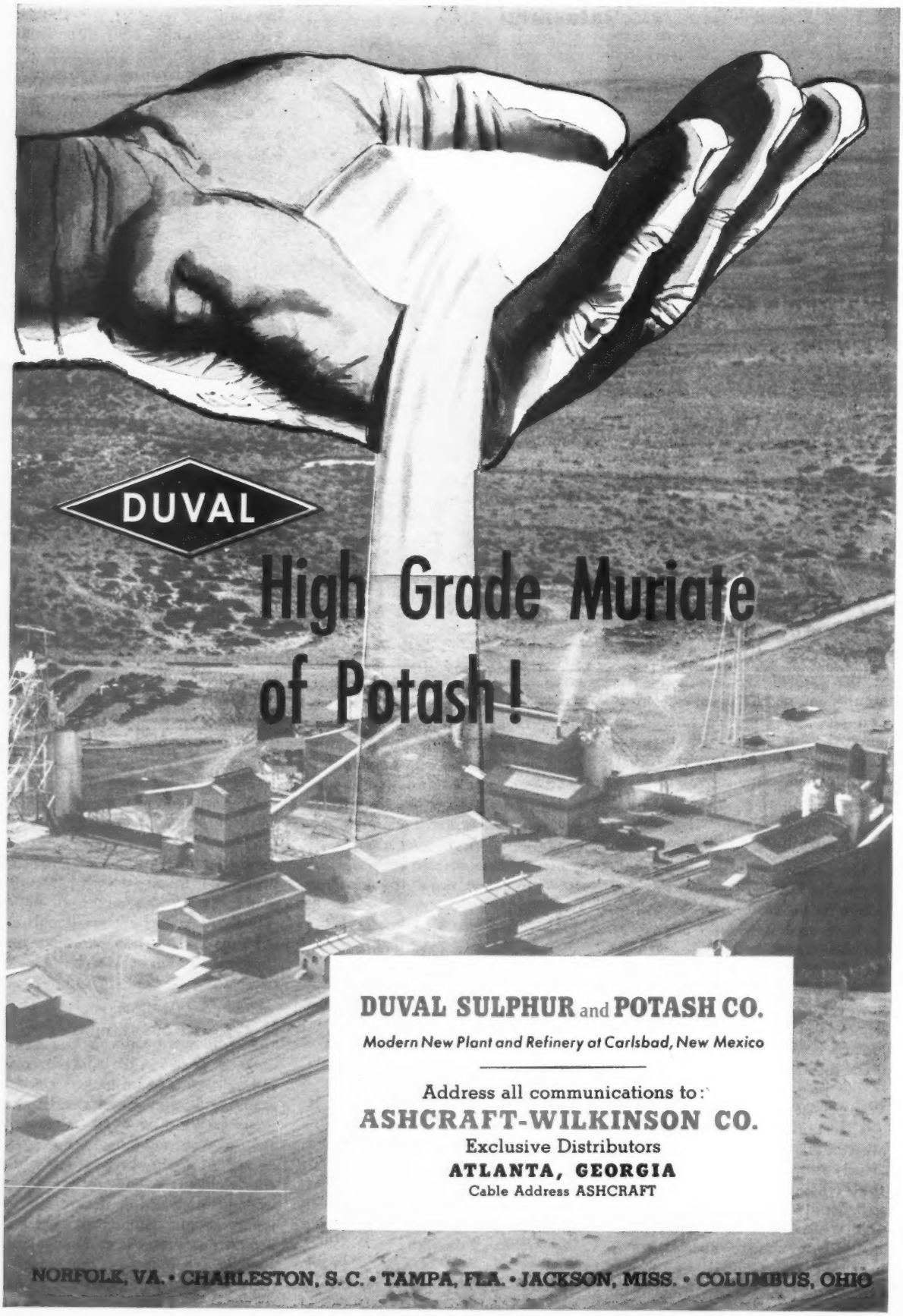
Finding a Solution

If this problem of getting along with people is really as important to you as I believe it is, then the question arises as to how intelligently, systematically and persistently we are willing to work at its solution. May I suggest in all sincerity that unless we are willing to work at it a little harder than at the dozens of other important problems confronting us, then most of us will never realize our full potential and stature in life. The man capable of getting enthusiastic cooperation from his associates or customers has strength that no officially-delegated powers on earth can ever produce. Getting along with people is an absolute "must" if we are to grow and climb and reach a happy and normal maturity.

Stating the problem and its importance is much easier, I hasten to admit, than finding and applying a solution. Nevertheless, difficult as it is, my observations convince me there are certain basic principles we can learn and then learn to use.

Power of Intangibles

Someone has said, "The power of intangibles is enormous. Understanding of that power divides the great persons from the mediocrities." At first glance, that may appear to apply overwhelmingly to the problem of how to get along with people, and it does to some great extent. But any casual observer must know how definite and specific are many of the requirements for causing others to like us. As much as a reminder to myself,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as they are suggestions presented for your consideration, I dare to mention something of my own philosophy on the subject.

Because I am more vain and egotistical than most people, I do not like to admit that I, myself, am a walking problem in search of a solution. This being true, I try to remember to confront every person I meet, whether a new associate, customer, or stranger, with the thought in mind it is not his problem to relate himself to me, but rather my task to relate myself to him.

An approach like this, I must admit, sometimes leads to a feeling of confusion and frustration—much like the pedestrian who stepped from the curb, just in time for a reckless driver to splash him from head to foot with mud and water. He stumbled back to the curb and shouted angrily to two innocent bystanders, "Did you damfools see that that gentleman just did to me?"

But occasionally, I meet a person who out-maneuvers me—he immediately overlooks my quirks, phobias, and eccentricities and accepts me just as I am. For that fellow, I reserve the largest possible share of my deep appreciation. He does not need to slip the candy out of my hand. I stand up proudly and feed it to him. In this respect, I wonder if I am any different from other people.

Seeking Acceptance

As I face a person wanting to relate myself to him, I must remember he is seeking above all else, *acceptance—full, complete,* and *unreserved* acceptance. He does not want to be tolerated, reformed, reworked, rewired, pushed, bossed, told of his faults, made the object of sarcasm or criticized justly or unjustly. If I but remember that I —nor all the king's horses and all the king's men—cannot remake or remold that individual, it helps me to give him the acceptance his very soul yearns for.

To play on the team of which I am a member, does he need to look like, think like, talk like and act like the other members of the team? *No!!*—a thousand times, No! Few things are so disappointing and disturbing to me as when an associate comes to me, as happens occasionally, I regret to say, pointing out the peculiarities of another associate. He says, "So and so has *a lot* of ability, but—."

It is truly disturbing to realize how many people feel they cannot relate themselves pleasantly and successfully to another person, unless that other person meets certain rather narrow specifications as to appearance, mannerisms, personality and philosophy of life. If I would be smart, I must look beyond these relatively unessential qualities to what contribution the

J. E. Culpepper

man can make to the common effort.

If he has the ability to get the job done, I consider it my job to curb my likes and prejudices to the extent of *accepting* this man *as he is* and getting along with him. Occasionally, one of my associates harps on the traits or mannerisms of another associate to the point I can hardly resist exclaiming, "For goodness sakes, do you think I am so odd I can't see the same undesirable things in that man?" Fellows, I see 'em all right, but I'm much more interested in what contribution each individual can make. If I were to adopt a policy of discontinuing relations with all the people in our company who do not fit into my concept of a perfect mold, I'd have a hell of a lot more work to do, and I'm convinced the company's interests would suffer.

Likewise, if we were to break off relations with all our customers who do not act and talk like we wish they would, the management of this company would very soon employ others to take our places. No, if we are to get along with people, we must accept them as they are.

Were I to set one goal above all others toward which I would strive, during whatever future I may have in administrative responsibilities, it would be that of learning and applying the secret of welding together, into a happy and effective work-group, men and women of widely varying temperaments, mannerisms and philosophy of life. If I could but attain this goal, gratifying results would be inevitable.

To relate ourselves to people effectively, we should remember the poet has said,

"A smile can burst the clouds in two,
And let the face of God shine through."

It's mighty hard to feel warm and friendly toward a person who seldom or never smiles. A warm, sincere smile is worth a thousand words in making a person feel comfortable and at ease. Let's learn to smile, to keep on smiling, and to mean it. From the pen of the late George Bernard Shaw came this, one of the shrewdest things he ever wrote:

"The worst sin toward our fellow creatures is not to hate them but to be indifferent toward them. That's the essence of inhumanity."

How true! I would feel more kindly toward an associate who would run over me twice a week with an automobile than for one who would ignore me the other days in the week.

Important Keys

Modesty and humility are important keys to the problem of Getting Along With People. "Let him who would be greatest among you become the servant of all" is one of the great fundamental and enduring tenets of our Christian philosophy. We reserve our most intense hatreds for those whom we suspect of trying to make us feel

(*Continued on page 59*)

One-Stop NITROGEN Service For Fertilizer Manufacturers

LION

Nitrogen

FERTILIZER MATERIALS

LION ANHYDROUS AMMONIA—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.25%.

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LION NITROGEN FERTILIZER SOLUTIONS—For formulation. Three types to suit varying weather and manufacturing conditions.

LION SULPHATE OF AMMONIA—For direct application or formulation. Large free-flowing crystals. Guaranteed nitrogen content, 21%.

TECHNICAL SERVICE—Lion provides special technical assistance for fertilizer manufacturers. Write to CHEMICAL SALES DIVISION for quick service.

LION OIL COMPANY

EL DORADO, ARKANSAS

Clark Adds New Tractor Line

Has Application For Fertilizers

FERTILIZER manufacturers will benefit from a completely new line of equipment for handling bulk materials announced Jan. 1 by Clark Equipment Co.

New products include six models of a tractor shovel or "front-end-loader" and will be marketed under the trade name "Michigan Tractor Shovel."

Clark also manufactures Michigan power shovels, cranes and draglines following its purchase last May of Michigan Power Shovel Co., Benton Harbor, Mich.

Three Types

These three major types of Michigan Tractor Shovels will be available in the Spring:

1. Two-wheel drive with bucket wheel drive and rear wheel steering;
2. Two-wheel drive with rear drive wheels and bucket wheel steering;
3. Four-wheel drive with rear wheel steering.

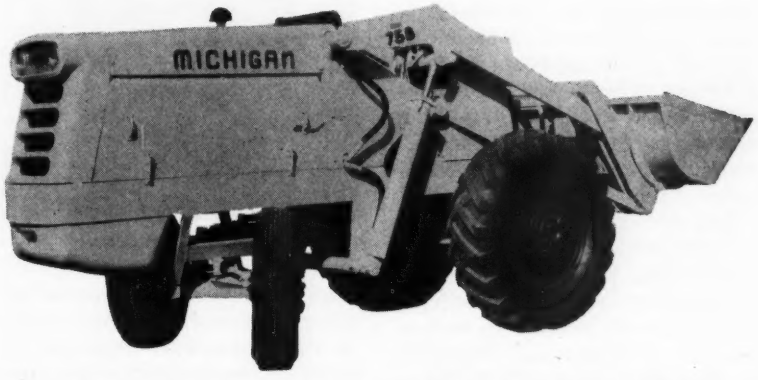
Equipment will be made at the outset in six models ranging in capacity from 15 cubic feet to 2¼ cubic yards.

"Step Forward"

George Spatta, Clark president, called the addition of tractor shovels to the line of materials-handling equipment "a significant step forward for our company." He said "Clark now is able to supply an item of equipment to industries where material is handled in bulk —including fertilizer—which contains the same engineering know-how that made our unit-load equipment, our fork-lift trucks and towing tractors the most widely accepted in the world."

Clarence E. Killebrew directed an entirely new department of engineers and materials-handling specialists which handled the development program leading to the new Clark line. He was assisted by Lowell Conrad, development engineer. ◆

Michigan's new Model 75-A one cubic yard capacity tractor shovel with four-wheel drive and rear wheel steering is one of Clark's products.



Model 75-B has bucket drive with rear wheel steering. Clark's Construction Machinery division manufactures all three tractor shovels.

Model 75-R has rear wheel drive with bucket steering. The tractor shovels will be available for delivery in spring, the Clark Company reported.

LEGISLATION

It controls and influnces progress in farm chemicals research, says Lea Hitchner

By Lea S. Hitchner
National Agricultural Chemicals Association

AT FIRST glance, research and legislation appear to be widely separated. Such a condition was true not many years ago in the field of entomological research. Today, however, a trend has fast developed so that research in entomology as well as all research in the broad field of farm chemicals not only is influenced but, in fact, is subject to legislative and regulatory controls which will decide the rate of progress in entomological research and farm chemical production and use.

The path of much scientific research historically has not been a smooth one, particularly in fields of endeavor where public acceptance has been subject to serious doubts. Innumerable examples could be given, such as Lord Joseph Lister's problems with antiseptic surgery, the fight against vaccination, the difficulties of Louis Pasteur, the rioting in our own streets when automobiles were first introduced and even laws preventing the use of bathtubs because people slipped and fell in them.

Little Resistance

Paradoxically, however, the introduction of pest control chemicals met little initial resistance from the public. Probably far less resistance was shown than to many of the innovations introduced in medicine, mechanization and other phases of technology.

Lea S. Hitchner

But, like an afterthought, slowly but certainly there is a growing trend to build up a fear of the use of these materials on our growing crops. The public is becoming unduly fearful because of the efforts of would-be scientists unacquainted with the tremendous amount of scientific research behind pesticides and the legal protection now in existence which assures the American public a safe food supply. No other country in the world enjoys as much variety, quality and safety in their foods as does America.

You and I know that agricultural pesticides can be used effectively without endangering the public health in any way, even though some of these materials may be toxic as chemicals. However, fueled by a few crusading individuals and organizations, the curtailment of these necessary tools to the production of agricultural products is under way.

This situation creates for our industry and for every individual concerned a public relations and legislative problem which must be met if we are, with enthusiasm, to continue research, development and use of chemicals for the protection of crops and health.

Adverse Criticism

The principal manifestation of this problem is indicated by the increasing amount of adverse and unsubstantiated statements in the press. Here we have a problem where the statements of the pseudo-scientists, being spectacular, are avidly received while the work of the competent scientists seldom makes the headlines.

A second manifestation is the serious legal problem resulting in unjustified and excessive liability claims.

A third important manifestation is the amount of legislation which is directed against various phases of production, marketing, distribution and use of farm chemicals.

In addition to the numerous laws now in existence on the statute books, during 1953 more than 250 bills with potential impact upon the production, distribution and use of farm chemicals were introduced. Let us look into some of the reasons for the introduction of these bills.

We find that there are approxi-

Presented at meeting of the Entomological Society of America, Los Angeles, Cal., Dec. 7, 1953.

mately 25 bases for proposed legislation. Some are sound; others a threat to progress. Among these are

1. Unjustified fears of the public reflected in so-called safety legislation. This can be broken down into the health of operators applying the materials, health of consumers using the finished food product and the health of the general public not in direct contact with pesticides.
2. The opportunity for legislators to win public support for political purposes, based on 1.
3. The eagerness of "do-gooders" to protect the general public from imaginary hazards.
4. A desire to increase revenues. This is reflected in proposals for increased fees, licenses to sell and licenses to use.
5. In some cases a desire on the part of Government agencies to increase controls and build up Government organizations.
6. The efforts of other industrial groups to avoid responsibility for conducting their own research and testing.
7. An effort on the part of some local groups to exclude out-of-state competition from local markets.
8. "Bell ringer" bills. Bills introduced for nuisance value with the expectation for pay-off to withdraw or kill objectionable legislation.
9. A sincere belief on the part of a state official or legislator that additional legislation is necessary to protect the public from either economic fraud or the possibility of harm in connection with the sale and use of pesticides.
10. New type of product creates new problems which are not satisfactorily handled by existing legislation.
11. Replacement of an outdated law by a modern one adapted to present day facts and needs.

(Let us interpolate here and get into the record the fact that NAC always has and now continues to support vigorously any sound legislation which is needed to protect the public health and the best interests of the growers. All we ask is practicable and workable control and then only when needed.)

Going back to the reasons for legislation, I mentioned only a few of the categories in which background for this legislation falls. Perhaps more important than these minor categories is the lack of an overall philosophy covering legislation and regulation.

Cost of Developing an Insecticide

Synthesis and screening	$ 70,000
Patent expenses	8,000
Field tests (involving entomology and pathology)	495,000
Pilot plant	50,000
Analytical methods	130,000
Tests for residue and flavor	388,000
Tests for toxicity	75,000
Tests for formulations	135,000
Label registration	95,000
Total	$1,446,000

Legal Confusion

Much has been written on the subject of agricultural legislation. There is, however, a confusion on basic philosophy covering legislation and regulation. Some of the confusion can be visualized from the following.

For instance, we have a philosophy voiced by the former Commissioner of the Food and Drug Administration, Dr. Paul Dunbar, which we have never seen reversed. He stated:

> "I feel that no chemical or no new chemical that is subject to any question as to safety should be employed until its possible, injurious effects, both on acute and over a long-time chronic basis, have been shown to be non-existent. In other words, any chemical that is proposed for use ought to be approved in advance of distribution in the food product to be utterly and completely without the possibility of human injury."

In practice, I feel confident this is not carried to the full extreme expressed by Dr. Dunbar, but most certainly the farm chemical industry cannot progress under such a program, and a frank recognition of the problem is justified.

The philosophy of the U. S. Public Health Service was expressed by Dr. J. G. Townsend, chief of the Division of Industrial Hygiene, as follows:

> "On the farm, as well as in the factory, dangerous chemicals may be used safely with proper precautions. If manufacturers, processors and distributors had to relinquish certain substances because they are toxic, American industry would be in a primitive stage. Likewise, the farmer need not bow to economic pests but can use to the fullest advantage the potent new insecticides if he is scrupulous in protecting himself."

Under the policy indicated by Dr. Townsend it is both possible and practical through cooperative efforts to meet the problems and assure the public adequate protection.

USDA Policy

The policy of the U. S. Department of Agriculture was expressed by Dr. E. L. Griffin, assistant chief of the Insecticide division, Livestock Branch, Production and Marketing Administration, as follows:

> "The Federal Insecticide, Fungicide and Rodenticide Act is intended to protect users of economic poisons—that is, insecticides, fungicides, rodenticides, weed killers and disinfectants—from faulty products and to avoid injury to persons

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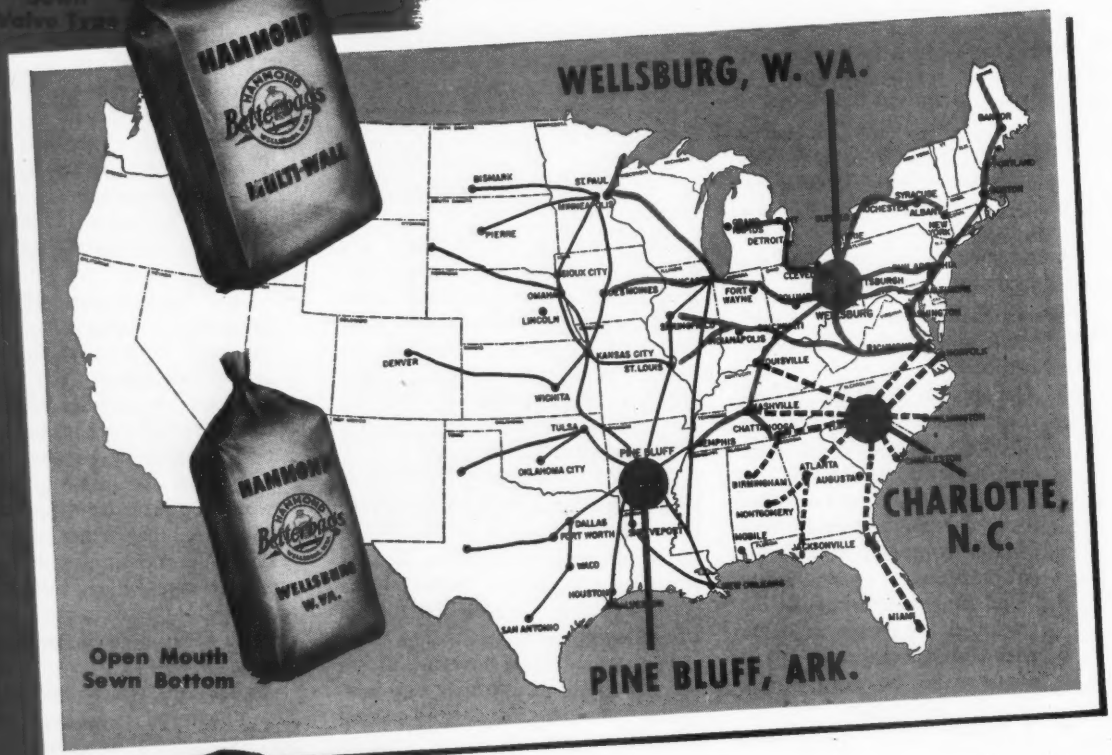

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and to beneficial plants or animals."

The administration of this law has been in the interest of the public and generally satisfactory to industry. However, we should recognize that even where we have sound legislation, undue pressure from uninformed groups easily can jeopardize proper administration of the law.

'Buyer Beware'

A similar problem in our industry is represented by a few unreliable distributors of pesticides who rely solely on the old proverb, "Let the buyer beware."

Between the extreme statements expressed by Dr. Dunbar that the material must be proven safe, which is technically impossible, and "Let the buyer beware," there should be a common philosophy which will protect the public and encourage the use of these vital tools in agricultural production. The present situation already has reached a point where the cost of research in relation to potential markets is out of all proportion.

Costs Way Up

A recent study by the staff of *Fortune* magazine resulted in an article in their November issue entitled "Farming's Chemical Age." As part of the article, the "prenatal history of an insecticide" was outlined, as shown in the accompanying table.

The table shows the cost of developing one product by a single company to be $1,446,000.

Assuming that we now have satisfactory materials, the costs of advertising, promoting and selling must be added. Theoretically, under the system of free enterprise and freedom of research the results of this work would be made available to the public but, in the case of farm chemicals, each one of these steps is subject to legislative limitations or regulations.

What would your reaction be to investing $1,000,000 in research to produce and market a pesticide when its use could be dependent entirely upon legislation and administrative procedures?

A Good Move

A step towards an approach to the problem is reflected in the current philosophy and proposed legislation of the Miller Pesticide Residue Bill, H. R. 4277, to amend the Food, Drug and Cosmetic Act. This Bill is the result of meetings of Government agencies, farm groups, research personnel, land grant colleges, entomological groups and others. I can report at this time that many of these groups now are much in accord, with some slight amendments, and we hope it will be passed at the next session of Congress. We believe that this Bill basically is a sound, practical piece of legislation under which all can operate and fully protect the public from any hazards. It would do much to clarify the present unsatisfactory situation.

FDA-Industry Accord

Much progress has been made in obtaining mutual understanding and confidence between the Food and Drug Administration and the industry. Progress in this respect is continuing.

Frankly, we are sitting on the lid of Pandora's box which pseudo-scientists and false crusaders are trying to pry open to release all of the imaginary evils. With the real facts about pesticides we can nail that lid tight.

Destroy Confidence

How to best reduce resistance to the progress of pesticides has many aspects. Certainly one of the primary problems we have is the factual refutation of minority groups and some individuals who are destroying confidence in how these products are used. Such irresponsible statements serve to enhance the necessity for scientists to defend their research findings with real facts in every instance. A practical example of this is the recent article, "Spray Residue Facts," by Dr. P. J. Chapman, New York State Agricultural Experiment Station, published and distributed in the New York State Horticultural Society News.

The support of sound legislation, such as the Miller Bill, with the kind of testimony presented before the Committee by members of the entomological profession, makes possible wide dissemination of the true facts. This support of the principles of the Miller Bill added greatly to the acceptance of this legislation and was a step in the right direction to protect their research activities and their contributions to American agriculture.

Inform Public

The true scientific facts which we all have must be presented at every opportunity to the public. The importance of pest control must be carried to your Congressmen and State legislators, the women's clubs, Rotary, Kiwanis and similar organizations. We must not only talk to each other, which we are doing, but to those who do not have a direct interest in our work.

Joint Responsibility

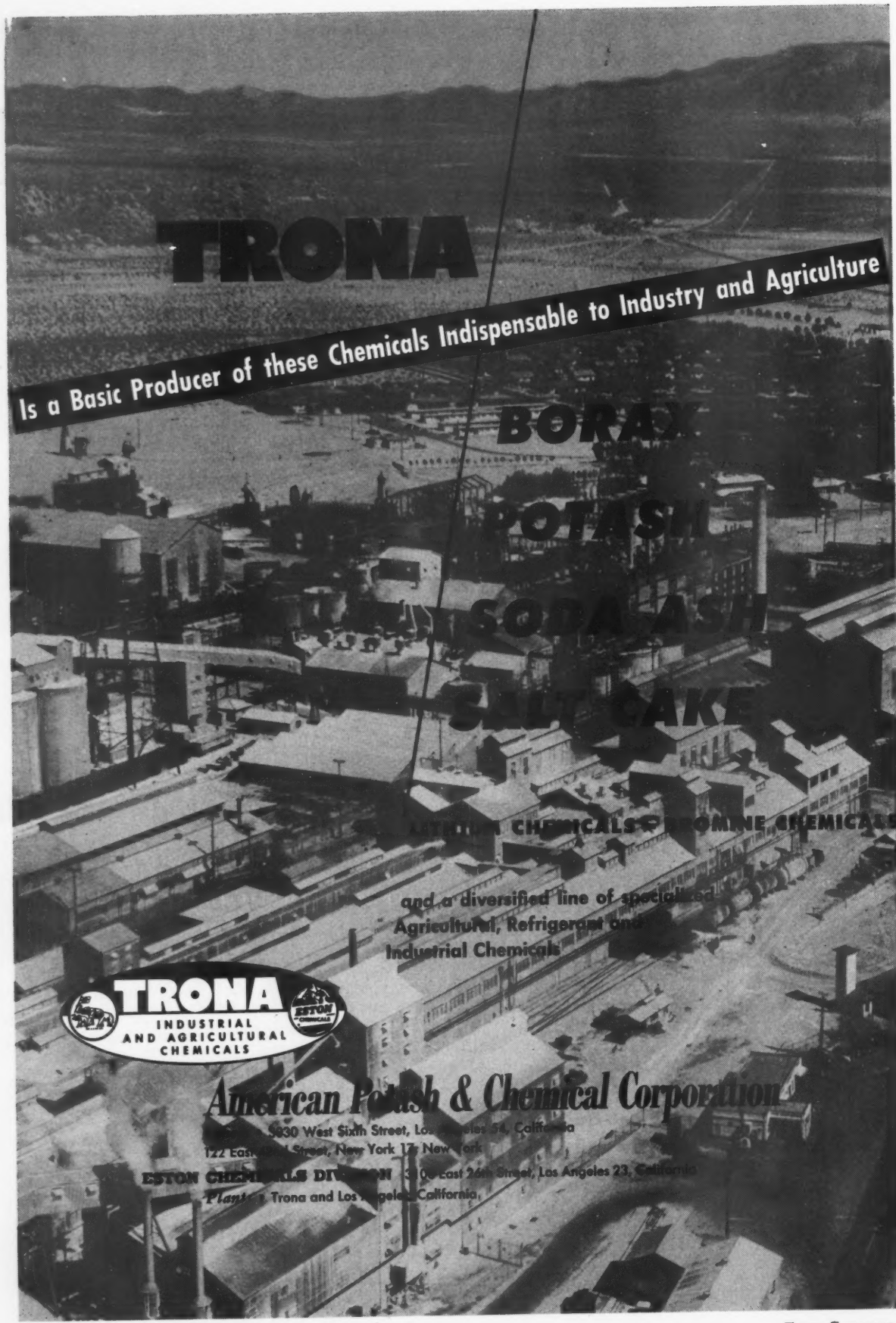
Most of us at some time have seen the misuse of chemicals and the resultant adverse publicity which tears down all of the good which has been accomplished and builds up the wall of resistance to a greater height. You share the responsibility with industry of making certain that all recommendations for use are followed precisely according to the best available information. The record of entomologists in this respect is of the best, but consistently pounding away at the correct usage of these materials will serve to keep down adverse situations and diminish resistance to their use.

Tremendous Potential

In conclusion, we should not forget the tremendous potential which is offered to the farmer and to the public health through the control of pests.

We could add $800 to the income of every farm family in the United States if we could eliminate 25 per cent more of the loss due to insects, diseases and weeds, and we could do this with a minimum of additional costs.

No other potential offers as much to the farmer as a means of reducing the costs of production or to the consumer of food who desires at lowest possible cost a variety of clean, wholesome food. These facts must be presented to the public through every channel possible, and all those interested in agriculture must participate. ◆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At Memphis, Dec. 16:

Industry Members Speak On Cotton Insect Control

MEMBERS of the pesticide industry took an active part in the well-rounded program of talks and panel discussions last month at the Seventh Annual Cotton Insect Control Conference.

The Conference, sponsored by the National Cotton Council of America, was held in the Peabody Hotel, Memphis, Tenn., Dec. 16 and 17.

Control of cotton insects is an important field to pesticide manufacturers, especially in view of cotton acreage quotas announced for this year.

As M. D. Farrar, of Clemson Agricultural College, put it, "The only answer to the problem of cotton income is increased production per acre, and without insect control, losses of 10 to 70 per cent of the crop are certain."

NAC Plan

Interest of the National Agricultural Chemicals Association in the meeting was manifest in a speech by W. W. Allen, vice president, who outlined to the group a cooperative NAC program to advise farmers and chemical dealers of the important role of pest control in lowering farm costs.

"This is a national program," Allen stated, "and will have the support of equipment companies, the chemical industry and related concerns engaged in supplying the farmer with crop protectants."

Industry speakers included W. Scott James, sales manager, Agricultural Chemicals division, Pittsburgh Coke and Chemical Co., L. C. Murphree, Coahoma Chemical Co. and A. C. Gunter, Hercules Powder Co.

James, speaking on the systemic insecticides symposium, declared that the chemicals promise a new era in the history of insecticides.

Calling systemics the "fourth stride" in the development of chemical insect control, he said one of the chemicals, Systox, already has been thoroughly tested and used extensively in cotton producing areas.

Both Murphree and Gunter were members of a panel entitled "Observations and Experiences with Cotton Insect Control in 1953."

Improper Use

Murphree pointed out that insecticides often get the blame for failing to kill insects when actually improper application is responsible.

He cited examples to illustrate the point and emphasized "the responsibility of all of us who have an interest in the problem to always stress the correct application of the proper insecticide."

Gunter focused attention on the important matter of timing in the application of cotton insect control materials. "It is too often the case," he said, "that a bollworm poisoning schedule is started at the time it should be finished. Proper measurement, application and poison selection are to no avail if timing is wrong," he added.

Other, more disconcerting news, came from the chief of entomological research for the Agricultural Research Service, USDA.

The chief, E. F. Knipling, told the conference "we must not assume that an insect for which we have satisfactory control today will be controlled by the same procedure one or five years from today."

Knipling said that fortunately, entomologists with federal, state and industrial research institutions are aware of the resistance problem and now are following trends in insect resistant development.

The marked increase in resistance of the cotton leafworm to toxaphene last year has been of special concern, he stated. The research chief said it was also noted that the cotton aphid and codling moth, for unexplained reasons, are not always controlled satisfactorily.

Only Solution

Only solution to the problem is continued and expanded research, he concluded.

The still undaunted pink bollworm got special attention in another panel. Speakers on the subject, including F. C. Bishopp, coordinator of Pink Bollworm Research, Brownsville, Tex., asserted that recent expanded efforts still are inadequate to control the pest when its total destructive potentiality is considered.

Other speakers, from federal and state departments, addressed the well-attended conference meetings, discussing every phase of cotton insect control and outlook for the future. ◆

DuPont adds insecticide to fungicide, offering

Improved Seed Protection with Arasan *plus* Lindane

THE already effective method of protecting seeds from soil diseases by using a fungicidal seed protectant is getting an added boost with an insecticide ingredient.

The doubled-barreled approach to planting protects the crop from insects in the soil as well as diseases. The combination, tested by DuPont last year on several crops, is called DuPont I and D Seed Protectant. It is based on Arasan seed disinfectant plus lindane.

Used Commercially

I and D was used commercially last year on peas, beans, corn and sorghums.

More plants and healthier ones from the same amount of seed is the way this chemical seed treatment pays off in improved stands, according to DuPont, as shown by evidence from 400 on-farm tests compiled by the company in three seasons of cooperative field trials under actual farm conditions.

The earlier tests were concerned only with the effects of a fungicidal material. In 1953 the insecticide ingredient was added and much improved stands were indicated.

Many Advantages

The combination has proved especially advantageous for preventing seed damage from wireworms, seed corn maggots and corn rootworms.

The information on I and D was contained in the fourth DuPont report on seed protectants, which was released last month to experiment station investigators throughout the country.

Summary of the report, which covered 170 tests, follows:

Grasses and legumes: This year's tests confirm previous indications that seed treatment with Arasan seed disinfectant will give an average increase in stand of about one-third over untreated seed.

Corn: Comparisons were made between one treatment with a blended insecticide-fungicide combination (Du Pont I & D Seed Protectant) versus a drill-box application of lindane for seed treated by the supplier with Arasan. Checks were treated with Arasan seed disinfectant alone. Where wireworms were moderate or severe, the blend treatment gave better stands than the drill-box insecticide application, and substantially better than the fungicide alone.

Soybeans: Nine tests showed an average increase in stand of 17 per cent for seed treated with Arasan over untreated seed.

Tests with Beans

Beans: Bean tests were made in Michigan, western Nebraska, Idaho and California. In California, where lima bean fields showed signs of serious infestation of soil insects, treatment with I & D Seed Protectant increased stands 30 per cent, 48 per cent and 278 per cent in the three test fields, compared with the untreated, while fungicide treatment alone gave only a little over half the above increases.

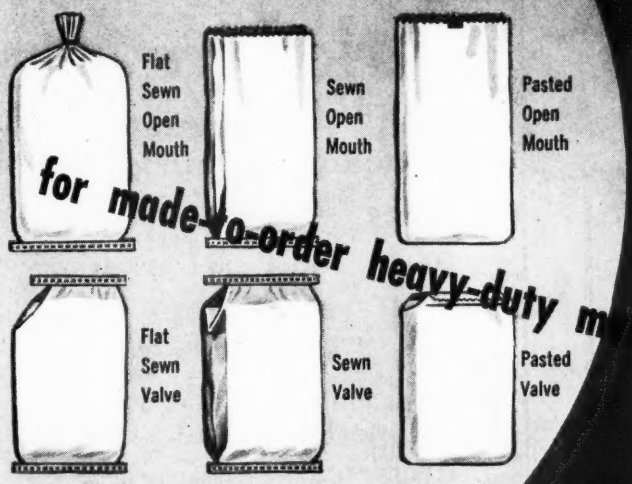
In bean tests in the other states, the blended treatment proved to be safe insurance. Stands in the Michigan fields averaged 18 per cent better than the check with 22 per cent fewer "bald-heads." Because soil-insect infestations are unpredictable in all bean-growing areas, the blended chemical treatment seems desirable as a general practice.

Peas and Vine Crops: In California tests with cucumbers, watermelons and cantaloupes, the varying results indicate need for further testing. But apparently the blended treatment is safer than drill-box application of lindane on seed previously treated with Arasan seed disinfectant.

Increased Stands

On watermelons, the blend treatment increased stands approximately 36 per cent over the untreated and 20 per cent over the fungicide-treated checks. On the one farm in Pennsylvania, where peas were damaged by maggots, the blend treatment gave a substantial increase in stand.

Cotton: The cotton tests are simply up-to-date experience confirming a well-known fact—that cotton stands can be substantially increased by proper fungicidal treatment of seed. In nine tests with acid-delinted seed, the increase in stand averaged 48 per cent. In 36 tests with fuzzy and machine-delinted seed, treatment with Ceresan seed disinfectant increased stands an average of 23 per cent. ◆



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USDA forsees 11 per cent rise:

Another Record For Fertilizers Expected in '54

SUPPLY of fertilizers moved up to another record high during the year ended June 30, 1953 and indications are that this mark will be surpassed by some 11 per cent in 1953–54.

The increased supply was absorbed through normal consumption channels, with no burdensome carryover of any types of plant foods.

Prices of fertilizers went up approximately two per cent in 52-53 over 51-52, but little changes from present levels are expected for the coming year.

The fertilizer expansion program is lagging in some respects. Potash expansion is proceeding apace, but there are indications the nitrogen and phosphate goals may not be reached before 1956 or later.

* * *

These are the salient points in the U. S. Department of Agriculture's recently issued "Fertilizer Situation for 1953-54."

In it the preliminary forecast of the 1953-54 fertilizer supply is combined with the usual mid-summer tabulation, showing reported deliveries of the three primary plant nutrients during the previous fertilizer year.

Supplemental Report

USDA intends to issue a supplemental report, reflecting any changes or developments, at a later date.

In stating that aggregate supply of N, P and K available for the 53–54 season probably will exceed last year's output by approximately 11 per cent, the report gives these facts for the three major plant nutrients:

Nitrogen (N)—The supply of nitrogen (N) available for fertilizer purposes in 1953–54 currently is estimated to exceed slightly two million tons. This is a preliminary estimate based on current information as to when a number of new synthetic ammonia plants are scheduled to be completed, and assumes about the same import-export balance as in 1952-53.

This represents an increase of approximately 11.2 per cent above the reported 1952-53 supply of 1,804,000 tons.

It is estimated that the supply of solid nitrogen materials (dry nitrogen) available for 1953-54 represents approximately 60 per cent of the total supply and that solutions and liquid materials (wet nitrogen) 40 per cent. For the previous year these percentages, based on trade deliveries, were approximately 62 and 38.

This report was prepared by the Fertilizer Staff, Mobilization Activities Branch, Commodity Stabilization Service, USDA. Many government agencies helped in the preparation of the report, which is the 11th in a series of reports on fertilizers issued by agencies within USDA. The National Fertilizer Association reproduced and distributed copies of the report to its members.

FARM CHEMICALS *includes in this article only the main points of the report for the benefit of fertilizer industry members.*

Phosphates (P_2O_5)—The supply of available phosphates for 1953-54 currently is forecast at 2.667 million tons, available phosphoric oxide (P_2O_5) basis. This estimate is based on current information with regard to the completion dates of new plants, trends in use and available production data.

The 1953-54 forecast supply of available phosphoric oxide is about 10.4 per cent above the 2.414 million tons which were put into domestic trade channels in 1952-53, according to data now available. The new plant capacity scheduled for completion in 1953-54 involves a sizable tonnage of concentrated superphosphate, which should substantially increase the supply of this material in relation to the total quantity of P_2O_5 available in 1953-54.

Potash (K_2O)—The program to expand the potash production is ahead of schedule. The 1953-54 supply of potash (K_2O) available for fertilizer purposes will reflect production from these new facilities as well as increases from older producing units.

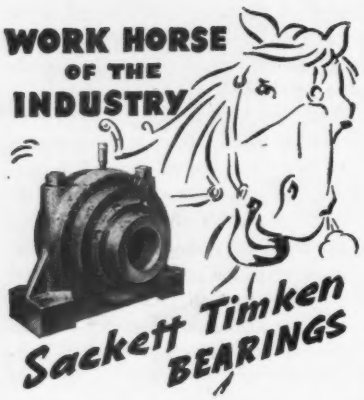
Considering the possible increase in domestic production, and assuming approximately the same import-export balance as in 1952-53, a 1953-54 supply of 1.941 million tons of potash (K_2O) is forecast. This amount is approximately 11.9 per cent above the reported 1952-53 supply of 1.739 million tons.

Fertilizer Expansion

In order to meet desired levels of crop production in 1954-55, it has been estimated that there will be needed for domestic fertilizer purposes 2.185 million tons of nitrogen (N), 3.485 million tons of available phosphoric oxide (P_2O_5) and 2.185 million tons of potash (K_2O).

In developing these estimates it was assumed that the consumption ratio of P_2O_5 and K_2O to N would be reduced from approximately 1:1.8:1.1 in 1950 to approximately 1:1.6:1 in 1954-55.

It now appears that the phosphate ratio to nitrogen will drop to 1.3 or 1.4 by 1954-55. Consumption of nitrogen and potash has paralleled fairly closely the Department's estimated requirements, while the consumption of phosphate has lagged behind, causing the consumption ratio to be narrowed faster than expected. ◆



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Entomologist advises dealers:

Keep Residue Levels Low

IT MAY be better to accept some insect injury and maintain a low chemical residue level than to attempt to prevent all insect damages by having an excessive residue load at harvest.

That was the advice given New Jersey dealers attending the annual state Insecticide and Fungicide Dealers' Conference at Rutgers in late November.

It was given by Dr. Bailey B. Pepper, chairman of the Department of Entomology at the state university, who spoke on residue, flavor and other problems affecting chemical recommendations.

State Dealers

Dealers from all parts of the state heard talks at the meeting on new developments in pesticides during the past year and recommendations for pesticides to be applied in the state for 1954.

In discussing the residue problem, Dr. Pepper pointed out that residue tolerances were placed on arsenic, lead and fluorine approximately 25 years ago and although great advancements have been made in the insecticide industry, no further tolerances have been established.

"Because there are no tolerances on the new organic insecticides," Dr. Pepper cautioned, "it is important that the farmer utilize proven materials and apply them according to application schedules which will result in the lowest possible residue levels at harvest."

In discussing flavor problems, Dr. Pepper said that early experiences with some of the organic chlorinated compounds "clearly demonstrated that improper use of these materials could result in a very undesirable quality of food crops, particularly some of the root crops."

Since 1946, he continued, the Departments of Entomology, Agricultural Chemistry, Food Technology and Plant Pathology have cooperated very intimately on the overall question of the effect of farm chemicals on the quality and flavor of fruit and vegetable crops.

A great majority of the insecticides used experimentally give a flavor difference between treated and untreated crops, he declared.

Flavor Difference

He stressed the fact, however, that the term "flavor difference" should not be construed to mean an undesirable flavor quality nor should it be construed to mean an improvement in flavor and quality.

"Tools and techniques with which we have to work at the present time do not give us an absolute answer," he added. "We are sure, however, that the question of flavor should be thoroughly investigated before a product is recommended for commercial use."

Formulation a Factor

Formulation of the insecticide has an important bearing on the flavor of crops so treated, he stated. Preliminary research indicates that the solvents particularly, and possibly emulsifying and other conditioning agents may affect quality of crops treated with such formulations.

It was pointed out that there is a relationship between taste and quality of fruits and vegetables and the fertilization program, soil types, irrigation and weather conditions.

Dr. Pepper also mentioned some of the basic research that now is in progress on the question of how chemicals, such as insecticides, affect taste and quality. ◆

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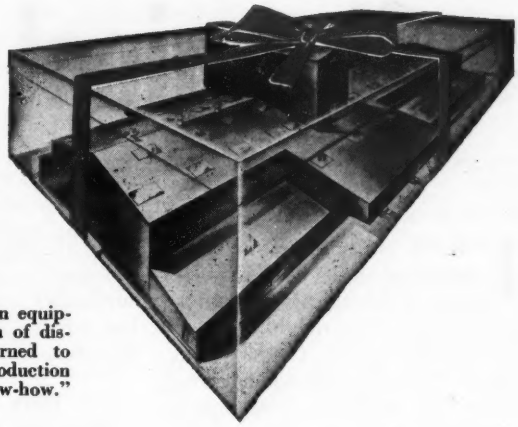

4 Building Construction

We construct the building from foundations to roof using the best materials obtainable in each component part. We include all electric power and lighting required including a power room, in which are located all motor controls for protection against usual dust and moisture conditions.

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We fabricate in our own shops production equipment of the very latest design. Upon arrival at the site, we install this equipment with highly skilled men under the supervision of thoroughly competent field engineers. Upon completion of this work, each component part is thoroughly tested prior to the plant's initial operation.

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There was something for everyone, including fertilizer and pesticide manufacturers, at

Chemical Exposition

THERE was something for everyone at the 24th Exposition of Chemical Industries last month in Philadelphia.

The fertilizer and pesticide industries were no exceptions. For among the record-breaking number of displays in the city's mammoth Convention Hall were scores of exhibits that stopped industry representatives for a second look.

Materials handling equipment, testing instruments, conveyors, trucks, chemicals, protective coatings, construction materials and laboratory supplies were among the 500 exhibits which attracted the attention of visitors at the exposition, which ran from Nov. 30 to Dec. 5.

Industry Represented

Delegates from fertilizer and pesticide manufacturers were well represented in the record attendance at the exposition, which covered an area of nearly five acres.

The exhibits of interest to the farm chemicals field made attendance at the show well worthwhile. Here are some of the exhibits that held the attention of industry men:

A working model of Chemical & Industrial Corp.'s complex fertilizer plant which employs the PEC carbonitric process. Angus Taylor, president of C & I, was on hand to describe the plant set up, which is very flexible and is capable of a high daily production.

Screen hammer mills, displayed by Combustion Engineering Inc., in a new, completely redesigned line.

An HD-5G crawler tractor with one-yard capacity front and tractor shovel and a "Ripl-Flo" vibrating screen; Allis-Chalmers Manufacturing Co.

Bulk-Flo Conveyor

Material handling and power transmitting equipment, featured by Link-Belt Co. The Bulk-Flo conveyor-elevator for handling granular, crushed, ground or pulverized materials attracted particular attention of fertilizer manufacturers. Also featured was a revolving display of various types of conveyor and drive chains, as well as a revolving stand of ball and roller bearings.

Equipment for a complete line of feeding, packing, conveying and drying units was shown by Jeffrey Manufacturing Co. Precision flow control, zoned control, dust-tight operation were among the advantages.

Pulva Corp.'s line of Pulva-Sizers and a stainless steel Com-Bin feeder, along with a laboratory pulverizer of "revolutionary" design.

Pulverizing Machinery Co. showed a working model of a high-suction pneumatic system for conveying granular material, a dust and particle collector and similar equipment.

Conveyor-Elevator

Stephens-Adamson Manufacturing Co. displayed its Redler conveyor and elevator system incorporating a circular bin discharger unit. Sealmaster bearings and some other items from the company's standard line of products also were in the exhibit.

Crushers and grinders were spotlighted at the Sturtevant Mill Co. exhibit. Micronizer grinding machine for crushing and grinding all types of dry, friable materials was shown.

In the line of centrifugal pumps, gate valves and mixers, Worthington Corp., was prominent. Capacities ranged to 12,000 gpm with heads to 550 feet.

Entered at the exhibition were 140 new displays more than the last show in New York, two years ago, making the program the largest of its kind ever held.

Heavily stressed among the various exhibits was the theme of new plant and process development. In line with this trend was added emphasis on custom-tailored and specially designed equipment.

Exposition Managers

Managing the exposition were Charles Roth, who has guided it since its inception, and Earl Stevens, the associate manager who has helped him for the past 20 years.

As usual with these shows, the equipment companies far outnumbered the raw materials suppliers.

Of the many novel ideas used by the entrants to attract the attention of the passersby Monsanto Chemical Corp.'s dice game was particularly effective. Monsanto offered a prize for anyone who successfully rolled the dice to spell out the company name. ◆

FERTILIZER MATERIALS MARKET

New York

December 10, 1953

Sulfate of Ammonia

A large Government order for Korea has just been awarded with most of the successful bids going to European producers. However, one large American producer received an order for 20,000 tons. Domestic market is slow and stocks are accumulating.

Nitrate of Soda

Importers are storing material at various ports in preparation of expected Spring demand. Movement is reported normal for this time of year.

Ammonium Nitrate

A new producer in the South now is reported in production which should do much to ease the tightness of this market. Demand, however, remains good from various sections as buyers take material as it is offered for shipment.

Urea

Market is reported slow at the moment with little demand. Offerings of imported material have increased recently and the price at the ports now is cheaper than domestic material.

Nitrogenous Tankage

A better demand was noted with one large producer sold up for nearby shipment. Present price range is $3.50 to $4 per unit of ammonia ($4.25 to $4.86 per unit N), according to shipping point.

Castor Pomace

The price of this material seems to be stabilized around $25 per ton, f.o.b. production points, and demand and supply is in better balance. An increased use is expected by the fertilizer trade because of present low prices.

Organics

Organic fertilizer materials showed a stronger tendency as business picked up with the feed trade and many of these materials are used in feed as well as fertilizer. Blood sold at $7 ($8.51 per unit N), f.o.b. New York with last sales of tankage at $6.50 ($7.90 per unit N), f.o.b. New York. Soybean meal advanced approximately $14 per ton in the last two weeks and currently is quoted at $71 per net ton, f.o.b. Decatur, Ill., bulk. Cottonseed meal was in better demand and linseed meal was very closely held for nearby shipments with last sales of 36 per cent material at $65 per ton, f.o.b. Minneapolis.

Fish Meal

Little change was noted with present price of 60 per cent fish meal at $133 to $135 per ton, f.o.b. shipping points. Menhaden fishing has ceased at northern points for this season but sufficient supplies of imported fish meal are coming in to fill buyers' needs.

Bone Meal

Some improvement was noted with shipments to the feed trade picking up. Present prices are about $55 per ton, f.o.b. production points, with some buying by fertilizer buyers for next Spring's use. Very little imported material is on the market at the present time.

Hoof Meal

This market advanced about 25 cents per unit in the past week and is now quoted at $6.25 per unit of ammonia ($7.59 per unit N), f.o.b. Chicago, with demand better than previously.

Superphosphate

Stocks on hand at production points are accumulating with no price changes noted. Little export business is available at the present time.

Potash

Movement is reported slightly better in certain parts of the South but shipments are still behind last year and some fertilizer manufacturers are delaying their mixing operations.

Philadelphia

December 10, 1953

The tone of the raw materials market still is not too encouraging. Nitrate of ammonia is reported continuing in short supply, but nitrogen solutions are said to be moving in good volume. Nitrate of soda is in normal position for this season of the year. Blood, tankage and hoof meal are higher, but bone meal, castor pomace and fish meal remain nominal at former levels. Sulfate of ammonia and superphosphate are moving a little better in some sections, but muriate of potash deliveries are very backward. Sulfate of potash is a little better. The over-all picture is still discouraging.

Sulfate of Ammonia.—A slightly better tone is suggested in some areas, but deliveries, in general, are slow and stocks are piling up.

Ammonium Nitrate.—This is reported still short of the demand.

Nitrate of Soda.—Market is steady and situation normal for this time of the year. No price changes.

Blood, Tankage, Bone.—Blood is stronger at $7 per unit of ammonia ($8.51 per unit N), with tankage also higher at $6.25 to $7 per unit ($7.59 to $8.51 per unit N), depending on location. Hoof meal is up 25 cents per unit, to $6.25 ($7.59 per unit N) in the West. Steamed bone remains quiet and rather nominal at $55 per ton.

Castor Pomace.—Market is very quiet and asking price remains $25.

Fish Scrap.—While this is quoted at $134 per ton for menhaden meal, demand is exceedingly slack and suppliers contemplate storing the goods awaiting a better market.

Phosphate Rock.—Supply is reported comfortable and demand moderate.

Superphosphate.—Market shows slightly better tone and better movement of triple grade.

Potash.—Shipments of muriate continue to be disappointingly backward. Sulfate, however, is said to be moving a little better to destinations in the South.

Charleston

December 10, 1953

Movement of mixed fertilizers continues below normal dimensions

for this period of the year, doubtless because of adverse weather conditions in various parts of the country. However, recent rains in the midwest and better weather conditions in Florida have caused increased movement in the last few weeks.

Organics.—Interest in organics is quite inactive except from the feed trade. However, domestic producers of nitrogenous tankage continue in a well-sold position at prices varying from $3.15 to $4.65 per unit of ammonia ($3.83 to $5.65 per unit N), bulk, f.o.b. shipping point. Occasional offerings of imported nitrogenous are indicated at approximately $4.50 per unit of ammonia ($5.47 per unit N), in bags, c.i.f. Atlantic ports.

Castor Pomace.—Latest sales of domestic producers have been at $25 per ton, in bags, f.o.b. northeastern production points. Imported material, depending on quality, varies in price from $32 to $38 per ton, bagged, ex-vessel South Atlantic ports.

Blood.—Dried unground blood, in bags, is offered in the Chicago area at $7.25 to $7.50 per unit of ammonia ($8.82 to $9.12 per unit N). The New York market is approximately $7 ($8.51 per unit N).

Potash.—Shipments against domestic contracts to fertilizer mixers are considerably behind schedule. Prices continue firm and unchanged. Imported muriate of potash currently is indicated at 50 cents to 57 cents per unit K_2O, bulk, ex-vessel Atlantic and Gulf ports. Imported sulfate of potash is indicated at approximately 90 cents per unit, ex-vessel.

Ground Cotton Bur Ash.—This source of potash, primarily in the form of carbonate of potash, is available for prompt and future shipment at prices approximating the delivered cost of domestic sulfate of potash. Analysis currently is 38 per cent to 42 per cent K_2O.

Superphosphate.—Stocks of 20 per cent grade superphosphate are very comfortable and withdrawals are somewhat behind schedule. Triple superphosphate supply is fairly comfortable temporarily but is expected to tighten later.

Phosphate Rock.—Movement of supplies from domestic mines is somewhat behind schedule but price remains firm and unchanged.

Sulfate of Ammonia.—Stocks at production points are heavy because of slow withdrawals, but prices remain relatively firm at previous levels.

Nitrate of Soda.—Imported stocks are being built up in anticipation of heavy spring movement. Prices of domestic and imported material remain firm and unchanged.

Calcium Ammonium Nitrate.—Supplies both in bulk and in bags continue available at several Atlantic and Gulf ports with importers planning additional quantities to arrive during the next several months. Prices remain $51.25 per ton in bags and $48.25 per ton in bulk, f.o.b. cars at Atlantic and Gulf ports.

Ammonium Nitrate.—Demand continues in excess of supply and prices remain firm and unchanged.

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MURIATE

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AMMONIUM NITRATE

CALCIUM AMMONIUM NITRATE

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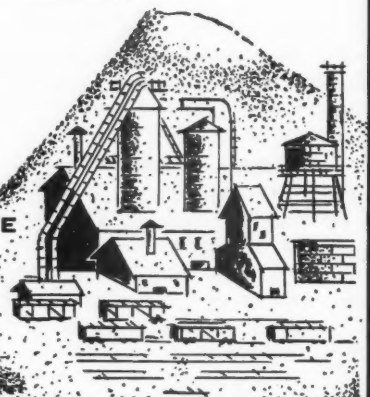

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Industrial News

New Products **New Plants** **New Appointments**

New NAC Herbicide Program To Keep Farmers Informed

To speed up the distribution of information to farmers on herbicides and crop defoliants, the National Agricultural Chemicals Association has established a new herbicide program, Lea S. Hitchner, NAC executive secretary, announced last month.

"We want to bring to the attention of farmers the economic gains which are possible through the use of these chemicals. With the increased farm labor costs and the softening of the market for commodities, we believe that weed killers and defoliants present a real potential to increase the farmer's net return," Hitchner stated.

Jack Dreessen, who has been employed to carry out the NAC herbicide program, joined the association staff in Washington, D. C. on January 1. He previously had been employed by the Agronomy department of Oklahoma Experiment Station in Stillwater.

In his new position, Dreessen will cooperate with interested groups and individuals who work with weeds, herbicides and defoliants and will coordinate as many activities and results of research work as possible.

Part of his duties will be to contact experiment stations, both federal and state, and to work with the pesticide industry, utility companies, reclamation companies and similar groups which are conducting programs for the control of weeds and brush.

Information arising from this new program, according to Hitchner, will be disseminated through the association's *NAC News*, the NAC press services and all other outlets which will reach leaders of agriculture.

Dreessen is a graduate of Oklahoma Agricultural and Mechanical College and has a B.S. Degree in agriculture with a major in agronomy. He was an honor graduate of the Moore, Oklahoma High School and received special mention with his B.S. Degree from Oklahoma A. & M. He has been conducting research leading to a Master's Degree in Agronomy in the pre-emergence control of weeds and grass in cotton and has had considerable experience with the chemical control of other weeds and brush. Dreessen is junior author of two publications on this latter subject. He has represented Oklahoma A. & M. at the North Central Weed Control Conference for two years.

Federal Chemical Co. To Expand at Butler

Federal Chemical Co. last month announced its plans to expand the Butler Ind. fertilizer plant.

The plant will be doubled in size and completely modernized with the latest mixing and shipping equipment, according to John V. Collis, president.

Conveyor belts will move all materials from the time they enter the plant until the completed product moves onto the customer's truck.

Semi-automatic mixing equipment will be installed and automatic value packers will handle the packaging.

The Butler plant is one of six chemical fertilizer plants operated by Federal in the South and Mid-West.

Potash Prospecting

A permit has been granted Potash Co. of America to prospect for potash on 100,000 acres near Saskatoon, Saskatchewan, Canada.

Exploration is expected to cost approximately $220,000.

Resigns

J. G. Brunton

J. G. Brunton last month resigned as sales vice president, Diamond Alkali Organic Chemicals division.

Brunton joined Kolker Chemical Works, Inc. in 1949 as vice president of sales and continued in that position following acquisition of the company by Diamond Alkali.

Previously, he had been employed by Pennsylvania Salt Manufacturing Co. for 10 years.

Fertilizer Loan

Tri-State Chemical Co. of Henderson, Ky. recently was granted a loan of $80,000 under the post-RFC lending program of the Small Business Administration.

The company, which plans to make fertilizer, was the first chemical company to get a loan under the program.

Money will be received from the First National Bank of Henderson, but will be partially guaranteed by SBA.

MCA Moves Office

The Manufacturing Chemists Association last month moved its Washington, D. C. headquarters to 1625 Eye St., N.W. It formerly was located in the Woodward Building.

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Industrial News

Smith-Douglass Prints Fertilizer Safety Book

An employe safety booklet, first ever published exclusively for use of a fertilizer manufacturing company, has been prepared by Smith-Douglass Co., Inc.

Edited by Vernon S. Gornto, safety director of the company and head of the Fertilizer Section of the National Safety Council, the 18-page booklet is designed for the firm's plant worker.

The importance of safety is well illustrated with the many cartoons contained in the booklet. "General safety rules, "10 Commandments for Good Housekeeping," rules for ladders and scaffolds, machinery, machine shops and fire prevention also are given.

Smith-Douglass says that much favorable comment has been received from authorities in the field, insurance safety directors, fertilizer manufacturers and NSC.

The company's 1951 accident frequency rate was 2.88, compared with 21.8 for the fertilizer industry, and its severity rate was .048 compared with 2.36 for the industry.

New Plant To Extract Sulfur in California

A new $9 million chemical fertilizer plant has started production at Kimberley, B. C., Canada.

Designed to produce daily 190 tons of ammonium phosphate, the new Consolidated Mining & Smelting Co. plant is part of the company's $56 million expansion program.

The Canadian company's engineers planned the new plant and L. J. Nicholson directed construction with a staff of 150 workers.

Niagara Ups Price Of Its Technical BHC

Niagara Chemical division, Food Machinery and Chemical Corp. has increased the carload and truck load prices of technical grade Benzene Hexachloride, 14 per cent gamma to 0.9 cents per gamma delivered. Less-carload shipments take the carload price plus one cent per pound.

"These increases have been made to bring prices more nearly into line with increased raw material and distribution costs and to permit us to continue our comprehensive service to consumers," J. V. Vernon, division president said.

Dividend Declared

Commercial Solvents Corp. last month declared a dividend of 25 cents per share on outstanding common stock to stockholders of record at the close of business on Dec. 9, 1953.

NFA's Russell Coleman:

He's Wearing 3-D Glasses

Dr. Russell Coleman addresses CFA Convention.

ALTHOUGH he doesn't have them on in the photograph, NFA's president, Dr. Russell Coleman, was wearing 3-D glasses at the recent California Fertilizer Association meeting in Carmel, Cal.

NFA didn't show one of those new-fangled Hollywood spectacles to amuse the 350 delegates at the 30th annual convention of CFA. Dr. Coleman, in fact, used a few old fashioned lantern slides in his address before the group.

He added the 3-D gimmick, however, as a rhetorical device that lent a note of novelty to a very important subject: *the economic aspects of fertilizer usage.*

Increase Profits

Everybody in the industry, of course, knows that plant foods can be used to increase profits. Important aspect of Dr. Coleman's talk, however, was his imaginative use of the 3-D craze to show even more vividly the part fertilizers play in the farm economy.

"The farmer's economic position usually has been viewed on the old screen, gauged by two factors—the price he gets for the things he sells and the price he pays for the things he buys," Dr. Coleman pointed out.

He said this view considers only the height and width of the farm picture and said a third dimension should be included.

Colored Glasses

That's when he asked his audience to put on those "funny looking colored glasses" and view with him the third dimension—**the one that shows farmers using production tools, including fertilizer, to cut production costs.**

Then he looked specifically at how fertilizer can be used to increase profits and to give depth to the farm picture.

The delegates thought the 3-D approach was an excellent way to present the case for more and better utilization of plant nutrients. ◆

Industrial News

Hercules' First Head Retires from Company

The first president and former chairman of Hercules Powder Co.'s board of directors, Russell H. Dunham, retired in December.

At that time, he completed 51 years of service with Hercules.

Dunham took office when the company was incorporated in 1912. He continued as president until March, 1939 and as chairman of the board until 1944. He was elected chairman of the finance committee in 1939, a post he held until last year.

Also retired from the company on Dec. 31 was Philip F. Powelson, after 41 years' service. At the time of his retirement he was divisional manager of wood procurement for Hercules' Naval Stores department.

USDA Sets Hearing On Pink Bollworm

Because infestations of the pink bollworm were found in two Arkansas counties, the U. S. Department of Agriculture has scheduled a hearing at Memphis, Tenn. for Jan. 14 to consider the necessity of extending the Federal pink bollworm quarantine to include Arkansas.

The infestations recently were discovered in Hempstead and Miller counties and it is proposed to include these counties in the regulated areas. Possible regulation of Columbia, Howard, Lafayette, Little River, Nevada and Sevier counties also will be considered because of the movement of cottonseed between these adjacent counties and the infested ones.

Potash from Dead Sea

Two-hundred-fifty tons of potash last month were loaded onto a British ship from the Dead Sea in Israel.

This was reported to be the first shipment of potash from the sea since the 1948 Arab-Jewish war. Approximately 3,000 tons are expected to be shipped to Manchester by the latter part of December.

Officials expect 100,000 tons to be produced in 1954 and 180,000 tons in 1956.

Entomology Anniversary

This year is a big one for economic entomology.

Members of the profession are observing the centennial of the field in 1954 with special observances. Although plans to celebrate the 100th birthday still are tentative, entomologists plan to make the public fully aware of the job they are doing to protect crops for human consumption.

Heading the planning committee is Dr. David G. Hall, director of information at the Bureau of Entomology and Plant Quarantine. Working with members of the Entomological Society of America, Dr. Hall has worked up factual information for release to the press, radio and television in the coming months.

The information is expected to include a summary of the important phases of entomology and insect control, charts, source material and photographs which will be presented in the form of articles in publications throughout the country.

A committee is working with the Postmaster General, considering the possibilities of having a commemorative stamp issued for the occasion.

Kennerly Retires from Hercules after 44 Years

Francis J. Kennerley, treasurer, member of the board and finance committee of Hercules Powder Co., retired in December after more than 44 years of service with the company.

He joined Hercules in 1913, and has worked in the accounting division, as assistant comptroller, comptroller, assistant treasurer and since 1943, treasurer.

Monsanto Elects Four New Vice Presidents

Four division general managers were elected vice presidents of Monsanto Chemical Co., effective Jan. 1.

Elected were Roy L. Brandenburger, general manager of the company's Merchandising division; Edward A. O'Neil Jr., Overseas divison; Charles H. Sommer Jr., Merrimac division and Robert K. Mueller, Plastics division.

The company also appointed two regional vice presidents, Edward W. Gamble Jr. and Victor E. Williams.

Gamble has been in charge of Monsanto's Washington, D. C. office since February, 1951 and Williams has been director of sales for the Organic Chemicals division in New York since 1943.

'Keep America Growing'

A new color film entitled "Keep America Growing—Quality Fruit" has been released by California Spray-Chemical Corp.

Depicted in the 30-minute film is teamwork of the grower, fieldman and scientist in producing top quality, disease-free fruit.

Copies may be secured on loan by contacting the corporation in Richmond, Cal. or its Ortho dealers.

International Awards Company Scholarships

Four-year scholarships have been awarded William Q. Burns Jr. and Paul E. Potterson by the Plant Food division of International Minerals & Chemical Corp.

Offered annually to division employes or sons and daughters of division employes, the scholarships provide $600 a year to apply to tuition, fees, books, room and board.

Four one-year scholarships amounting to $300 which were offered to members of the Future Farmers of America and 4-H Clubs have been awarded to Gill K. Brown, Billy S. Perryman, Charles P. Rader and Jack E. Sellers.

Industrial News

Fertilizer Plant Output Is 'Completely Committed'

The first six months' output of Western Phosphates, Inc.'s new $5 million fertilizer plant at Garfield, Utah is "completely committed" according to John P. Jones, vice president.

Production is expected to begin shortly at the plant, which can produce 90,000 tons of phosphate chemicals annually, mostly as triple superphosphate. Some nitrogen-phosphate fertilizer and phosphoric acid also will be produced at the plant which is expected to employ 90 workers.

Monsanto Organizes New Section for Production

A production planning and control section has been set up by Monsanto Chemical Co.'s Organic Chemicals division in its Production department with H. A. Hashbarger as section supervisor.

The new section will prepare and plan long and short range production schedules for all of the division's four plants, have staff supervision over production planning and scheduling, control inventory forecasts and long range raw materials forecasts. These assignments previously had been carried out individually by the plants.

Woodcock Appointed

Charles A. Woodcock this month was named general sales manager for multiwall bags at St. Regis Paper Co.

He has been succeeded as district manager of the Multiwall Packaging division's Midwestern Sales District by Frank W. Myers Jr., former assistant manager.

Both men are vice presidents of St. Regis Sales Corp., the company's sales subsidiary. Woodcock will make his headquarters in New York City.

Increased Fertilizer Use Urged in Kansas

Kansas farmers could use profitably four to six times as much fertilizer as they currently use.

This belief was expressed last month by Floyd W. Smith, Kansas State College soils expert.

"If fertilizers were being applied at prescribed rates, Kansas farmers would be using between 1,000,000 and 1,500,000 yearly, rather than the 262,000 reported in 1952," Smith stated.

In his opinion, "Only sound education and a training program can bring a farmer to realize his costs can be reduced through use of fertilizers."

Bunting Named Manager

Henry S. Bunting has been named grain fumigant sales manager by Thompson-Hayward Chemical Co.

He will supervise fumigant sales and the promotion of chemicals for grain sanitation, for insect and rodent control, and will promote development of new products for the trade.

Clark Equipment Program

Clark Equipment Co. has established a low-cost equipment leasing program to operate through its dealers on a national basis, according to W. E. Schirmer, vice president.

Under terms of the program, the dealer is owner and lessor, with Clark providing the direct financing. Equipment is leased to the customer for a three- or five-year period. Annual rental is decreased as machine ages.

Higher Crop Production Sought

WE SHOULD not be misguided by present American farm surpluses which, viewed against long-range food needs are, in all probability a temporary dislocation in our farm production and distribution system."

This advice was given by Dr. K. Starr Chester of Battelle Memorial Institute in his speech to those in attendance at the Food and Fiber section meeting of the Mid-Century Conference on Resources for the Future at the Shoreham Hotel in Washington, D. C., last month.

Because of sharply rising population and decreasing number of acres available for farming, he said, there is world-wide need for increasing the per-acre production of food.

In this country alone, conventional farm production could be increased at least 80 per cent if proved methods of scientific farming were practiced more extensively, Chester stated. Among these methods were included soil and land conservation, mineral fertilization, pest control, irrigation and drainage and the use of more productive varieties of crops and livestock.

The research scientist referred to the following as unconventional measures, still in early stages of development, which show promise of increasing per-acre food production far beyond that of conventional agriculture: hydroponics or the culture of plants in sand, gravel or water; fresh-water fish farming; chemical, nonnutritive promotion of animal and plant growth and the culture of fresh-water algae for food and feed.

Full production can only be obtained, it was said, if all necessary production factors are applied in a balanced manner.

Another key figure who addressed the group was Dr. Byron Shaw, head of the Agricultural Research Service, U. S. Department of Agriculture.

MONARCH SPRAYS

This is our Fig. 643 Nozzle. Used for Scrubbing Acid Phosphate Gases. Made for "full" or "hollow" cone in brass and "Everdur." We also make "Non-Clog" Nozzles in Brass and Steel, and

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Industrial News

Foster Talks On Persistence

PERSISTENCE of toxic effects on plants from certain commonly used organic insecticides was reported last month to the American Association for the Advancement of Science by A. C. Foster, plant pathologist of the Agricultural Research Service, USDA.

In tests carried on at the Plant Industry Station in Beltsville, Md., Foster reported finding wide variations in the persistence of different insecticides, with variations also attributable to the type of soil. Different crops and even varieties also showed a wide range of sensitivity and tolerance to the materials.

In the case of DDT, for example, the scientist reported Abruzzi Rye and Stringless Black Valentine Bean to be highly sensitive. Wheat and corn varieties tested, however, were found to be quite tolerant to large amounts of this material.

Compounds included in the studies carried on in greenhouses, coldframes and fields were DDT, BHC, toxaphene, chlordane, heptachlor, lindane, aldrin, dieldrin, endrin, isodrin, rothane, methoxychlor, CS-708 and certain chemical variants or isomers of DDT, BHC and chlordane.

Studies in the greenhouse benches, Foster said, showed DDT and the related compounds rothane and methoxychlor to be among the most persistent followed by dieldrin and toxaphene. Chlordane, aldrin, BHC and lindane were less persistent.

DDT mixed in Chester, Sassafras, Evesboro and a muck soil in coldframes at 25, 100, 400 and 1,000 pounds per acre in 1945 persisted from 70 to nearly 90 per cent after eight years. In some other soils high in iron and clay having a low acidity as shown by a high *p*H, DDT was found less persistent.

In the Chester, Sassafras, Evesboro and muck soil, doses of 100 pounds or more of DDT still were toxic to sensitive crops after eight years. DDT containing impurities was found to be much more toxic than the pure chemical.

"The relative tendency of organic insecticides tested to accumulate in soils following their application in simulated spray schedules," Foster explained, "is roughly the same as the persistence of heavy single doses. Heavy applications of DDT in a fruit spray schedule for three years resulted in accumulations under the trees great enough to interfere with growth of rye as a winter cover crop.

"BHC and lindane were found to be the least stable in the soils studied, but small amounts of either may impair the quality of many crops grown in contaminated soils. Preliminary data indicate that endrin ranks with DDT in persistence, and isodrin is intermediate."

In greenhouse studies, aldrin, dieldrin, BHC and lindane were most generally toxic to a diversity of crop plants, pound for pound, during one to three years following single massive doses to the soils. Beans were sensitive to more different substances than cereals and most other crops tested.

APFC Gives Agronomy Cup

Dr. Darrel Metcalfe (right), national chairman of the American Society of Agronomy's Student Activities Section, presents the society's "best student agronomy club in 1953" award to University of Nebraska's Klod and Kernel Klub representative, Dale Nitzel. The American Plant Food Council donated an engraved loving cup for the contest. Paul T. Truitt, APFC president, is at left. The award was presented in Dallas, Texas.

FTC Puts Damper On 'RX-15' Advertising

The Federal Trade Commission recently ordered Garden Research Laboratories to stop advertising that "RX-15" came out of atomic research.

In other FTC action, Loamium Co. of America replied to the commission's charges of misrepresentation of the effectiveness of a lawn improving agent named "Kem-Kut" which is made by U. S. Rubber Co. and sold by Loamium Co. as follows:

"The advertisements . . . are the advertisements and representations of the U. S. Rubber Co., and the respondent acted and sold Kem-Kut on the assurances and promises of the U. S. Rubber Co."

Industrial News

Industry at College Talks

When industry members gathered at Manhattan, Dec. 11-12, for Kansas State College's sixth fertilizer conference, they were given results of the college's fertilizer usage experiments conducted during the past year.

Reports covering laboratory, greenhouse and field studies were delivered by members of the agronomy department and agricultural experiment station personnel and fieldmen.

Dr. W. A. Albrecht, chairman of the soils department, University of Missouri, was principal speaker at a banquet on Friday, Dec. 11. His topic was "Soil Fertility and Plant Nutrition."

Fertilizer company representatives presented the Friday morning program, which included a discussion of fertilizer supplies, and the state's college and experiment station personnel reported on their experiments.

In addition to company personnel, representatives of the National Fertilizer Association and American Plant Food Council were in attendance at the conference.

Greece Needs Pesticides

Greece may purchase $800,000 worth of agricultural pesticides in this country and its possessions under a procurement authorization issued by the Foreign Operations Administration.

The contracting period extends through March 31 under authorization number 40-236-00-4004.

1-1-1 fertilizer formulas – 8-8-8, 10-10-10, 12-12-12 – are rapidly gaining in popularity among farmers. It's easy to supply both nitrate and ammonia nitrogen in 1-1-1 formulas and other grades of fertilizers by blending the proper amounts of NITROGEN SOLUTION and SULPHATE OF AMMONIA. No other source of nitrogen is needed to make these formulas. This economical team produces mixtures which cure quickly, are more granular, non-dusty and free-flowing – better fertilizers for you and your customers. *Ask our Technical Service Bureau!*

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Industrial News

C. F. A. Board of Directors and Man of the Year

HERE'S THE BOARD of directors of the California Fertilizer Association, elected at the recent meeting in Carmel, Cal. From left, Sidney H. Bierly, executive secretary and manager; Howard H. Hawkins, Glendora; William E. Simas, Salinas; William E. Snyder, vice president; Murray C. McNeill, Hayward; Beverly H. Jones, president; Howard G. Conley, Berkeley; W. L. Dixon Jr., Oakland; Jack Baker, secretary-treasurer and James M. Quinn, Los Angeles. Board serves in 53-54.

THE MAN OF THE YEAR: E. J. Shaw, right, Western Manufacturer, Chilean Nitrate Sales Corp., accepts plaque from J. M. Quinn, CFA past president. Award was made to man who "contributed most to welfare of fertilizer industry in West in '53."

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Industrial News

Na-Churs Plant Food Co. Offers First Money-Back Guarantee

THOUGH money-back guarantees may be common on many products, "Na-Churs" Plant Food Co. believes it is the first to offer a money-back guarantee in the fertilizer industry.

B. Peterson, company president, explained, "We believe our company is the first to back up its product and its advertising claims with a cash-refund guarantee. We believe it is the most daring offer ever made to farmers in connection with a fertilizer product, and we hope the offer will go far to overcome the wait-and-see attitude of many growers who apparently have felt that claims for liquid fertilizers have been too good to be true."

The company says its guarantee, which will be in effect during 1954, assures the grower 100 per cent refund of purchase price if use of its product fails to produce an increase in yield sufficient to show a profit. Growers have been asked to leave an untreated check plot in each field as a basis for comparison in determining whether the use of "Na-Churs" liquid fertilizer was profitable.

Some of the factors which influenced the company's decision to offer the guarantee, Peterson stated, include:

1. Accumulation of grower testimonials and research tests which prove the effectiveness of liquid fertilizer.

2. Difficulties on the part of growers who have not tried "Na-Churs" to believe that the small quantities used can produce significant results.

B. Peterson

3. The need to clarify fuzzy thinking about liquid fertilizer resulting from the different types on the market and confusion created by what has been published about it.

"Na-Churs" is a 7–14–7 fertilizer containing trace elements.

Eisenhower Elected

Edgar N. Eisenhower has been elected to the board of St. Regis Paper Co. to fill the vacancy created by the death of William K. Dick.

Eisenhower is senior partner in the law firm of Eisenhower, Hunter, Ramsdell and Duncan, which has acted for a number of years as counsel for St. Regis in the Pacific Northwest.

Dorr Promotes Five

Five senior department heads were promoted to vice presidents at Dorr Co.'s board of directors meeting in December.

The new officers are Frank H. Conover, manager of the Procurement and Production department; Harold B. Coulter, head of the Mechanical Engineering department; John D. Grothe, manager of Dorr's Consulting Engineering department; Douglas C. Reybold, controller and director and Dr. Elliott J. Roberts, technical director in charge of research development.

Fertilizer Plant Opens

A new plant to extract crude sulfur by the autoclave process will be erected in Mexico by Texas International Sulphur Co.

Design of the plant, located near San Felipe, Baja Cal., is under the direction of J. Harry Pollard, the company's consulting engineer. He also will supervise the plant's construction and operation.

An extensive geological survey and engineering studies were conducted before the decision was made to erect the plant, the company stated.

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Industrial News

Monsanto Names Sloman, Gardner to New Posts

Monsanto Chemical Co. has appointed Michael H. Sloman director of promotion for its Merchandising division and R. Allan Gardner sales manager handling the division's agricultural products and surface coatings.

Sloman since 1915 has been active in the newspaper and advertising fields.

Gardner, who joined Monsanto in 1944, has served as assistant advertising director and advertising and sales promotion manager for the Merchandising division.

Hudson Promotes Safety

Hudson Pulp & Paper Corp. last month announced it will cooperate with its multiwall sack customers in the promotion of industrial safety.

First feature of the safety campaign is to get the theme "Work Safely" into the minds of plant employes. Caps are being distributed by Hudson salesmen with the slogan "Work Safely" printed on them in large red letters.

Classified

Wanted: Young College graduate in chemical engineering willing to start in production and work up by a fast growing organization in the Northwest now contemplating expansion in new process developments in the fertilizer industry. Presently operating two plants. Opportunities excellent. Address "440" care FARM CHEMICALS, Phila. 7.

Wanted: Aggressive young man, mid 30's, now employed as superintendent in acidulation and complete fertilizer plant, to develop into assistant to manager of fertilizer division of a fast growing organization in Northwest. Must have good educational background and have clean record of getting things done. Opportunities good. Address "445" care FARM CHEMICALS, Phila. 7.

Wanted: Plant superintendent for acidulator and fertilizer plant in Northwest. Opportunities good. This open position due to expansion in our organization. Address "450" care FARM CHEMICALS, Phila. 7.

. . . *Culpepper*

(Continued from page 31)

inferior. Hanging is too good for the man who subjects me to his bragging, nagging, unsolicited display of knowledge, or the man who claims credit for everything.

Just let that kind of person try to get me to do something, and I'll "show him for sure" how *little* and *narrow-minded* I really can be. Would that a Kind Providence ever remind me that my associates, my neighbors, the stranger I meet, and, yes, the customers of our company react just as I do to such displays of poor manners!

Tied up in this problem of getting along with others is the question of not taking ourselves and our opinions too seriously. Few if any of us possess the wisdom, knowledge, insight and experience to justify our taking the position we are *completely* and *unconditionally* right on any subject. A modest expression of sincere opinion usually carries much more weight than defiant, bombastic and unrelenting statements of position.

Most of us avoid those who tell us they are right and then proceed to make us agree with them. Such an attitude on our part can be depended upon to lose us the warm friendship of our associates, and the patronage of our customers. Personally, I have a lot of opinions, of no great consequence, which nobody but the Good Lord and I know anything about. I am persuaded I can accomplish more by listening to the other man's ideas, on many occasions, rather than broadcasting my own. At least I have a good chance to keep a friend, rather than lose one.

Much wiser men than I have attempted to unlock the secret chambers in which might be found the answers to the baffling question of why and how some succeed, far beyond others, in being able to Get Along With Their Fellowman. I don't profess to know the answers, even the most superficial ones; however, I am convinced the learning and using of some principles, observed even by some of the most unlearned people, will bring results many of us have never dreamed of.

In summary, I might say I feel mighty happy, and friendly, when a person smiles, does not ignore me, gives me a firm handshake, accepts me as I am, permits his modesty to make me feel comfortable and refuses to take himself or his opinions too seriously. That man's praise I'll sing to the sky, his interests I'll keep foremost in my mind, and his very wish will be my command. I'd bust my britches trying to help him. Wouldn't you? ◆

Buys Phosphate Lease

A phosphate lease at Rex Peak, Utah, has been purchased by J. R. Simplot from W. H. Cranmer and John Archer.

The phosphate mined will be used in a triple superphosphate fertilizer plant recently placed in operation by Simplot at Pocatello, Ida.

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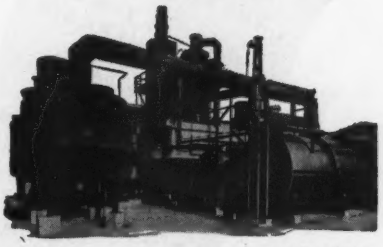

Chemico's services cover every detail in design and construction of sulphuric acid plants, acid concentrators, complete fertilizer plants and P-A Venturi Scrubbers for fluorine fume elimination.

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Minerals in the soil are essential to the healthy growth of plants and optimum yield of vitamin-rich crops. The addition of minerals stimulates fertilizer sales and creates more business because the planter of today wants assurance of the best available production from his land. Mineralized fertilizers add that extra sales punch through increased yield of vitamin-rich crops. As basic producers of minerals, we'd like to discuss with you the advantages of mineralized fertilizers, and show you how to increase your fertilizer tonnage and profits by adding minerals. We can supply mineral mixtures in any quantity you specify, large or small.

SOLUBLE TRACE MINERALS

Tennessee's trace minerals are soluble and their nutritional value is immediately available to the plant. Soluble trace minerals are more economical and faster acting.

For detailed information, phone, wire or write—

TENNESSEE TC CORPORATION

617-29 Grant Building, Atlanta, Georgia

. . . New Products

(*Continued from page 21*)

Rodenticides

PIVAL CONCENTRATE. Motomco, Inc.

Chemical name: 2 pivalyl-1, 3-indandione. **Uses:** Anticoagulant rodenticide with insecticidal and fungicidal activities. Highly effective in its anticoagulant action against rats and mice and also imparts to cereal baits, resistance to both insect infestation and the onset of molds. Soluble sodium salt form now under development for use in water baits, expected to have application around grain storage areas where poison free feed is openly available. **Availability:** Marketed as 0.5 per cent concentrate for use in preparation of cereal baits at ratio of one part concentrate to 19 parts bait mixture.

TOMORIN BAIT CONCENTRATE. Geigy Co., Inc.

Description: Anticoagulant rodenticide. Relatively safe and can be mixed with any suitable bait.

Soil Conditioners

KRILIUM SOIL CONDITIONER LIQUID. Monsanto Chem. Co.

Description: Formulation for crust control in surface applications by growers of row crops. Tests with cotton on 40-inch row spacing showed requirements to vary from one half gallon for ¼ inch bands to one gallon for two inch bands.

POLY-ACK 15. Wilson Organic Chem., Inc.

Description: Soil conditioner designed for agricultural application to control soil crusting and hard-panning.

Trace Elements

DISODIUM TETRINE. Glyco Products Co., Inc.

Description: Disodium salt of ethylenediamine tetraacetic acid. **Uses:** As a basis for preparation of trace metal element compounds for deficient soils. Metals such as iron, copper, manganese, etc., can be prepared by this method to be made available to plants. **Availability:** Commercial quantities.

IRON TETRINE. Glyco Products Co., Inc.

Description: Iron salt of ethylenediamine tetraacetic acid. **Uses:** To supply trace amounts of iron to plants grown in iron deficient soils. Used commercially in Florida citrus groves to overcome chlorosis. **Availability:** Commercial quantities.

TETRASODIUM TETRINE. Glyco Products Co., Inc.

Description: Tetrasodium salt of ethylenediamine tetraacetic acid. **Uses:** Same as disodium tetrine. **Availability:** Commercial quantities.

TETRINE ACID. Glyco Products Co., Inc.

Description: Ethylenediamine tetraacetic acid. **Uses:** Same as disodium tetrine. **Availability:** Commercial quantities.

TRISODIUM TETRINE. Glyco Products Co., Inc.

Description: Trisodium salt of ethylenediamine tetraacetic acid. **Uses:** Same as disodium tetrine. **Availability:** Commercial quantities.

Miscellaneous

AMINE MIXTURES. Carbide & Carbon Chem. Co.

USES: Specially designed for solubilizing 2, 4-D and 2, 4, 5-T acids. **Availability:** Commercial quantities.

BUTOXY ETHOXY PROPANOL. Carbide & Carbon Chem. Co.

Uses: Esterifier for 2, 4-D and 2, 4 5-T to produce esters of very low volatility with excellent herbicidal activity. **Availability:** Commercial quantities.

BUTYL BENZOATE. Carbide & Carbon Chem. Co.

Uses: Solvent for pentachlorophenol and alpha-naphthyl amine for manufacture of wood preservatives. **Availability:** Commercial quantities.

CRAG FLY REPELLENT. Carbide & Carbon Chem. Co.

Chemical name: Butoxypropylene glycol. **Uses:** Incorporated in oil base dairy and livestock sprays, emulsifiable livestock spray concentrates and space sprays. Repels biting and nuisance flies, is a pyrethrin and allethrin synergist and a solvent for many commonly used toxicants and synergists. **Availability:** Commercial quantities.

ETHOXY ETHOXY PROPANOL. Carbide & Carbon Chem. Co.

Uses: Esterifier for 2, 4-D and 2, 4,5-T to produce esters of very low volatility with excellent herbicidal activity. **Availability:** Commercial quantities.

MARACARB N. Marathon Corp.

Description: Complex mixture of sodium lignosulfonate (approximately ⅓ by weight) and the alkaline hydrolysis products of pentoses and hexoses (about ⅔ by weight). **Uses:** Shows considerable promise as a catalyst deactivator for use in pesticide formulations and during 1953 was used exclusively with Aramite. There are indications that use can be extended to a number of other toxicants. Five or six per cent Maracarb N, mixed thoroughly with carrier prior to addition of the toxicant and wetting or dispersing agents, curbs the catalytic activity of the material and considerably prolongs shelf life of the formulation. **Availability:** Commercial quantities, 55 gal. drums to tank car lots.

S/V SOVASPRAY 100. Socony-Vacuum Oil Co.

Description: Pesticide carrier. Low viscosity, colorless, virtually odorless isoparaffinic oil. Claimed to have extremely low phytotoxicity. **Applications:** Solvent and synergist of oil soluble pesticides; vehicle for pesticides in low volume spray equipment for application of nutrients, growth regulators, etc.; carrier and penetrant for some herbicides; diluent to inhibit phytotoxicity of other carriers.

TERGITOL DISPERSANT NP-27. Carbide & Carbon Chem. Co.

Chemical name: Alkyl aryl polyethylene glycol ether. **Uses:** A non-ionic dispersant soluble in aromatic solvents and used as a component of emulsifiers for insecticides to give improved dispersion and hard water tolerance to formulations. **Availability:** Commercial quantities.

Where To Write For More Information

American Cyanamid Co., Agricultural Chemicals Div., 30 Rockefeller Plaza, New York 20, N. Y.

American Potash & Chemical Corp., 3030 W. 6th St., Los Angeles 54, Cal.

American Vermiculite Corp., 654 Madison Ave., New York 21, N. Y.

Antara Chem. Div., General Dyestuff Corp., 435 Hudson Street, New York 14, N. Y.

Armour & Co., Armour Chemical Div., 1355 W. 31st St., Chicago 9, Ill.

Calcium Carbonate Co., 222 W. Adams St., Chicago 4, Ill.

Carbide & Carbon Chem. Co., Div. of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

Dow Chemical Co., Midland, Mich.

The Emulsol Corp., 59 E. Madison St., Chicago 3, Ill.

Floridin Co., Inc., 220 Liberty St., Warren, Pa.

Geigy Agricultural Chemicals, Div. of Geigy Chem. Corp., 89 Barclay St., New York 8, N. Y.

Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y.

Heller Greenhouse Laboratories, 218 E. Pikes Peak Ave., Colorado Springs, Colo.

Marathon Corp., Rothschild, Wis.

Monsanto Chemical Co., Organic Chem. Div., St. Louis 4, Mo.

Motomco, Inc., 10 Murray St., New York 7, N. Y.

National Analine Div., Allied Chem. & & Dye Corp., 40 Rector St., New York 6, N. Y.

Ninol Laboratories, 1719 S. Clinton St., Chicago 16, Ill.

Nitrogen Div., Allied Chem. & Dye Corp., 40 Rector St., New York 6, N. Y.

Pioneer Chemical Associates, 3035 E. Colfax, Denver 6, Colo.

Pittsburgh Plate Glass Co., Corona Chem. Div., 632 Duquesne Way, Pittsburgh, Pa.

Planetary Chem. Co., Ballas Rd., Creve Coeur, Mo.

Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y.

Southern Clays, Inc., 33 Rector St., New York 6, N. Y.

Stauffer Chem. Co., 420 Lexington Ave., New York 17, N. Y.

Summit Mining Corp., Summit, Pa.

Thompson Hayward Chem Co, 20th & Southwest Blvd., Kansas City, Mo.

U. S. Industrial Chem. Co., 120 Broadway, New York 5, N. Y.

U. S. Rubber Co., Naugatuck Chem. Div., Naugatuck, Conn.

Universal Detergents, Inc., 1825 E. Spring St., Long Beach 6, Cal.

Velsicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

Wilson Organic Chem., Inc., P. O. Box 452, Sayreville, N. J.

H. L. Woudhuysen & Assoc., 17 Battery Pl., New York 4, N. Y. ◆

Fulton Bag Announces Scholarship Winners

Winners of Fulton Bag & Cotton Mills' milling scholarships at Kansas State College are L. Neal Atkinson, Roger Bishop, Bert L. Curry and Richard Robertson.

The scholarships were established in 1949 to attract young men to the milling industry and assist them in their technology education. Four $1,000 awards are made each year and funds distributed over the four year college period at the rate of $250 per year.

Accidents Decrease

Accidents in chemical plants of participating member firms of the Manufacturing Chemists' Association were reduced 12 per cent during the first eight months of 1953 as compared with the same period last year, according to Alexander J. Wuertz, secretary of the General Safety Committee of MCA.

In a speech to the Down River division of the Industrial Safety Council, in Wyandotte, Mich., Wuertz attributed the reduction in accidents to three factors: 1. alertness and personal participation of top management in safety programs, 2. assignment of better trained safety supervisors and 3. stepped-up education programs.

. . . Survey

(*Continued from page 10*)

we believe that it did with most other companies in this region. (Southwest.)

* * *

Our insecticide profits in 1953 were not as satisfactory as we would like. There was a profit from this business.

* * *

If there was a wide divergence of opinion concerning the profit and loss situation during 1953, there was almost unanimity in replies to the question concerning inventories. Here's how it was stated:

2. Was the high inventory situation, complained of by so many manufacturers after the 1952 season, improved any?

"Yes" answers to that question outnumbered, by more than five to one, the "No" replies.

The reply "no; if anything, much worse." was far outweighed by other, more optimistic comments. Most of the replies stated flatly that the situation was improved, with some industry leaders offering reasons.

'Greatly Alleviated'

One East Coast manufacturer said "the high inventory situation existing at the end of 1952 was undoubtedly greatly alleviated during 1953. The basic difficulty, however, lies in the fact that in many of the most important chemicals productive capacity is so far in excess of actual need that high inventories can again be built up almost overnight."

Another company does not find "any abnormally high inventories either with mixers, dealers or consumers," while a Midwest firm reports "the improvement in inventories is spotty but on the whole, it is not a lot better than in 1952."

In the Southwest, Kerley, of Southwest Fertilizer, declared the inventory situation "was materially improved, particularly on the lower level among the formulators. In talking with the producers, most of them do not seem to be too worried about their present inventories, as far as quantity is concerned."

Several persons mentioned "strict controls" as the reason for improved inventories, but one of these cautioned that he believed BHC, lindane and certain other items "are in long supply."

Price Rise?

Will the price of pesticide materials rise or fall next year? That question also raised considerable comment in the FARM CHEMICALS survey.

It was phrased like this:

3. Based on current trends, do you look for any important price adjustment in such chemicals as DDT and BHC next spring?

Persons looking for increases outnumbered those who did not by about four to three. Many of those who expect slight price rises in various pesticide materials temper their enthusiasm with the warning that overproduction of most materials can cause a price drop very quickly.

Consensus of the industry, as determined by the replies to the questionnaire, is that prices can't go anywhere but up, if they move at all, but that the rises will be moderate and subject to the threat of oversupply.

Here are some typical comments:

". . . we feel that there possibly will be some adjustment in the price of DDT and BHC but, that unless the industry disciplines itself or the demand way exceeds the supply, these adjustments might not hold. Certainly the retail prices on finished formulations have to have some adjustment upward or BHC and DDT cannot go up."

"Producers of DDT already have announced higher list prices. Whether these can be maintained in the face of heavy stocks is a question . . ."

"In our opinion, the recent strengthening in the price of DDT indicates that the basic manufacturers must feel this material and others such as BHC are priced at reasonably profitable levels."

'Could Go Lower'

Among the negative answers to the third question, this from J. B. Haviland was the strongest: "No, but they could go lower."

The final question was stated as follows:

4. What is your company currently doing in the way of sales approach, marketing, promotion, etc., to improve the present poor profit picture?

Increased emphasis on selling and training salesmen to be technical advisers were listed most frequently by pesticide personnel as ways to combat the poor profit picture.

Other companies said they were looking into diversification of products, improved packaging and marketing and a general revamping of the sales setup.

Companies were split about 50-50 on the question of using new methods, but most are continuing emphasis on techniques that have been successful in the past.

Several companies quite frankly don't know what to do to better their positions.

Just Praying

Said one "we are sincerely *praying*, which is all we have been able to do, that the present poor profit picture will be improved by next spring."

Another declared that "if there is anything in the way of sales approach, promotion, etc., to improve the profit picture in the face of existing conditions it would be something well worth knowing about."

W. Newton Long, in his letter, questioned whether any one spectacular move is the answer. He said "we are inclined to think the answer will come from many small improvements rather than one radical one. With that in view we are naturally trying to improve efficiency in all operations and to eliminate all unnecessary expenses."

That answer seemed to summarize the opinion of most companies replying to the questionnaire, and it is contrasted with another reply from a manufacturer who is not so patient in the face of continuing bad years.

He said "we are going to attempt to raise our prices and if we cannot sell finished formulations at a price wherein we purchase the materials and make a profit, we are going to let someone else have it." ◆

Giving the bugs

'Both Barrels'

THERE is good evidence this month that a "double-barrelled" approach with insecticides may be one answer to the increasing problem of insect resistance.

It comes from the Connecticut Agricultural Experiment Station, where research workers say they have found that using a mixture of two insect control chemicals is a lot more effective than switching to a new spray material every time resistance is built up to the last one.

According to Neely Turner, head of the station's entomology department, a mixture of two insecticides, each of which attacks the bug population in a different way, has given excellent results in overcoming the resistance problem.

Nerve and Stomach Poison

Turner stated that by using two materials which kill insects in different ways; for example, a nerve poison and a stomach poison, resistance has been largely overcome.

Applying insecticides as a mixture also is advantageous to the grower, because he doesn't have to worry about remembering which insecticide was applied at the last spraying.

In the past it has been quite a popular practice to alternate chemicals when resistance is manifest. This has two disadvantages (in addition to the memory factor):

Laboratory experiments have shown, Turner reports, that insects already resistant to one insecticide often become resistant to another within a very short time.

Limit Would Be Reached

Secondly, one would soon run out of effective spray materials to fight the pests, as one case of resistance after another developed.

Connecticut tests have shown that a mixture of methoxychlor and dilan gives good control of the Mexican bean beetle (a big state problem).

For the potatoe flea beetle chlordane mixtures with dilan, aldrin, dieldrin and heptachlor look good, while rotenone and pyrethrum in combination are effective against the cabbage worm. ◆

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What's Wrong?

WHAT'S wrong with the pesticide industry?

It wasn't FARM CHEMICALS' intention to find the answer to that question (or even to raise it) in a special questionnaire sent out by the staff last month to representative members of the industry.

The survey was intended to determine just how many companies in the industry were in the red last year, and how many sneaked through in the black.

We also sought answers to the inventory situation, the trend in prices of pesticides and the new techniques, if any, being used by industry members to combat the present poor profit picture.

We got answers to all these questions, and we have summarized them in the article starting on page 9.

But we got more than we expected.

For, in many of the letters from company leaders replying to the survey, gripes about certain trade practices were included that made us wonder just what is wrong with the pesticide industry.

We don't claim to have the answer to that one. In fact, we doubt that anyone replying to the FARM CHEMICALS questionnaire has, despite the liberal amount of complaining.

But several of the replies contain comments that might profitably be presented in this space for the benefit of other industry members.

MOST of the dirty linen was aired in replies to question No. 4 in the survey, which asked what the companies were doing in the way of sales approach, marketing, promotion, etc., to improve the present poor profit picture.

About half the companies replying reported they are doing something new in the way of marketing and selling in an attempt to brighten the profit picture a bit, or at least reduce the losses.

But an alarmingly high number, as reported in our article, is just sitting by waiting for better times to come.

One man said he would like to hear about any improved methods of selling pesticides if anyone has any to offer.

Another stated flatly, "we are sincerely *praying*, which is all we have been able to do, that the present poor profit picture will be improved by next spring."

Others answered that they are stepping up sales technique, diversifying their production or cutting the poor profit items in their line.

But many feel there are certain basic fallacies in the industry. Consider these quotes:

"Frankly, I think it will take two or three years of successive red figures before the industry fully realizes the effects of practices such as consignment accounts, 'fall dating,' overproduction, downgrading of the distributor-dealer-grower relationship and unreasonably high profit margins on new materials. Another unfortunate feature which will be of increasing concern to reputable companies, such as ourselves, is the tremendous product liability without adequate protection to the manufacturer."

". . . we have been spoiled during the past 10 years by abnormal earnings and profits . . . we must get realistic in our own expenditures and earnings, and point out to . . . farmer customers that after all they are in pretty good shape."

"We are not very encouraged on the future profit picture, but think that the industry will rebound within a few years as soon as a certain group of it reaches the conclusion that insects control consumption of insecticides and price cutting does not increase the movement."

Many of the replies to the questionnaire listed constructive things being done by industry members to improve their operations. These too, are reported in our article.

BUT the question stands. What, indeed, is wrong with the pesticide industry?

It probably helps the dispositions of harassed industry leaders to let off some steam occasionally in answering queries such as the one this magazine sent out.

But it would be a lot more constructive if all these complaints and suggestions were presented in an organized manner before representatives of the industry at a trade conference.

We strongly urge the National Agricultural Chemicals Association to consider presenting a forum on the topic at the spring meeting of the group in Houston.

Perhaps then we all can find out what's wrong with the pesticide industry. And while we're at it, we may be able to make a few things right.

—HAMILTON C. CARSON

Here's *free information* to help you solve fertilizer, pesticide problems

Reader Service

1—Eye & Lung Protection

Companies which handle farm chemicals often have problems protecting eyes and lungs of their employes. Willson Products, Inc. has had long experience in the safety equipment field and is ready to supply information on its respirators. For a copy of Willson literature

CIRCLE 1 ON SERVICE CARD

2—Anionic Disperants Bulletin

In its bulletin No. 120, the Chemical division of Marathon Corp. describes the function and uses of a group of anionic disperants, under the trade name of "Marasperses." The bulletin explains how Marathon's product can be used to prevent or retard the settling of finely divided solids in water suspensions. Other details are explained. For a copy of the bulletin

CIRCLE 2 ON SERVICE CARD

3—Automatic Solution Tanks

Although a relative newcomer in the field, Davison-Kennedy Co. has a small folder giving information on its automatic solution tanks and cluster hoppers. For a copy

CIRCLE 3 ON SERVICE CARD

4—Magnetic Separators

Are you familiar with the operation of a magnetic separator? We have received a beautifully executed eight-page folder from Dings Magnetic Separator Co. showing its equipment in detail. The folder is illustrated and explains how a magnetic separator works. For a copy

CIRCLE 4 ON SERVICE CARD

5—Phosphate Tanks

If you are interested in bulk storage of phosphate, Butler Manufacturing Co. can furnish the information you desire. Butler can give details on the tank storage of phosphate, potash and other fertilizers. The company says you can load spreader trucks faster and easier and at less cost. For more information

CIRCLE 5 ON SERVICE CARD

6—Phosphate Rock Grinding

For economic grinding of phosphate rock, Combustion Engineering Inc. claims its Raymond Roller Mills have a long record of efficient service. They have automatic control and dust-free operation. Low maintenance and power costs insure low economical service. For complete details and catalog No. 69

CIRCLE 6 ON SERVICE CARD

7—New Link-Belt Book

When it comes to belt conveyor idlers, Link-Belt's new book No. 2416 shows an array of 500 idlers in 34 different types. The book has recently been released and contains 48 pages. For a copy

CIRCLE 7 ON SERVICE CARD

8—Pesticide Study

Attapulgus Minerals & Chemicals Corp. has prepared a study covering aspects of use of granular Attapulgite in the formulation of soil pesticides. The report discusses properties of the company's granular carriers. For a copy of the study

CIRCLE 8 ON SERVICE CARD

How to use the
READER SERVICE CARD

- **Circle number of literature you want.**
- **Print your name, position, company and address.**
- **Clip and mail the Service Card.**

9—Dust Collector

A self-cleaning dust collector is manufactured by the Pangborn Corp. Some of the advantages of its equipment, the company says, are continuous automatic operation, constant air volume and suction, uniform air flow resistance, etc. For a copy of a folder showing cut-away views

CIRCLE 9 ON SERVICE CARD

10—Conveyor Catalog

A catalog of 86 pages dealing with belt conveyors is available from Jeffrey Manufacturing Co. The catalog should be useful to those persons interested in conveyor belt problems and designs. It also contains engineering data. For a copy

CIRCLE 10 ON SERVICE CARD

11—Hammer & Roller Mills

A wide range of hammer and roller mills are made by Williams Patent Crusher & Pulverizer Co. The company makes equipment to handle a bold eight mesh to a superfine 400 mesh. Williams maintains a complete testing and research service. For literature giving complete information

CIRCLE 11 ON SERVICE CARD

12—"How to Operate A Lift Truck"

"How to Operate a Lift Truck" is the title of a booklet by Hyster Co. It is done in a two-color cartoon technique for easy reading and contains lots of information on lift truck operation, maintenance, safety and basic materials handling. For a copy

CIRCLE 12 ON SERVICE CARD

13—Ser-X

Ser-X is the trade name of an insecticide diluent produced by Summit Mining Corp. The company says Ser-X has excellent drift control and desirable suspension properties. The product has a neutral *p*H and better flowability. For complete information and samples

CIRCLE 13 ON SERVICE CARD

14—Lead Handbook

A compact handbook which fits easily into the pocket is available from Evans Metal Co. The handbook gives the many different sizes and weights of lead pipe needed for many different installations. It also gives comparative weights per square foot according to thickness. For a copy of the handbook

CIRCLE 14 ON SERVICE CARD

15—Liquid Level Controls

Magnetrol, Inc. makes liquid level controls which are extremely versatile. They do not use bellows, diaphragms, packing glands or electrodes. Magnetrol literature shows cut-away diagrams and other data. For a copy

CIRCLE 15 ON SERVICE CARD

16—Fertilizer Units

There is a nicely illustrated booklet of 16 pages available from Sturtevant Mill Co. The booklet contains some blueprint reproductions of single and double elevator mixing units. This looks like a very worthwhile piece of literature. For a copy

CIRCLE 16 ON SERVICE CARD

17—Manual on Methyl Bromide

A manual on Pestmaster methyl bromide is available from Michigan Chemical Corp. The company says its manual gives complete facts on every phase of its products application for rodent, insect and weed control. For a copy

CIRCLE 17 ON SERVICE CARD

18—Portable Bag Closer

We have received an attractive four-page lithographed folder from Dave Fischbein Co. showing its portable bag closer. It weighs only 10½ pounds, requires no installation; merely plug it into any electrical outlet. The company claims it will close an average 100 pound bag in six seconds. For a copy of the folder

CIRCLE 18 ON SERVICE CARD

19—New Fertilizer Spreader

A new type of fertilizer spreader has been developed by Century Engineering Corp. One of its features is a power take-off instead of being driven by the wheels. A three-speed control has been incorporated for changing the stroke of the agitator. It is also claimed the spreader cannot be stalled by chunky fertilizer and that flow is positive and even on wet or frosty ground. For further details

CIRCLE 19 ON SERVICE CARD

20—Power Shovel

A power shovel that digs in while standing still and has a 52 inch reach is now built by Lessmann Manufacturing Co. The company says its "Loadall" equipment has clearance for the highest trucks, bins and mixing hoppers. It loads or unloads at any height from 12 inches below wheel level to 108 inches above. A dozer blade can also be attached for yard maintenance. For complete information

CIRCLE 20 ON SERVICE CARD

21—Soluble Trace Minerals

As a basic producer of minerals, the Tennessee Corp. claims its soluble trace minerals are more economical and faster acting. The company can supply mineral mixtures to your own specifications, in large or small quantities.

CIRCLE 21 ON SERVICE CARD

22—Fast Curing Surfactant

Udet F is a surfactant produced by Universal Detergents, Inc. to be used in the manufacture of mixed goods to give faster curing, softer piles and cake-resistant fertilizer. Stocks are warehoused nationally for quick delivery. For technical information and prices

CIRCLE 22 ON SERVICE CARD

23—Lead for Acid Handling

The National Lead Co. states that the term "lead" as used in its eight-page booklet is a convenient all-inclusive word that covers what in reality are lead alloys based on "chemical" lead. The folder goes on to explain in detail and is nicely presented. For a copy

CIRCLE 23 ON SERVICE CARD

AT YOUR SERVICE

Farm Chemicals has given the popular Reader Service department of the magazine a face-lifting with this issue to help make the service more useful and convenient to our readers.

In redesigning the monthly feature, we have been able greatly to increase the number of items about new products, materials and bulletins of interest to personnel in the fertilizer and pesticide industries.

24—Impact Pulverizer

A modern production impact pulverizer is made by Pulva Corp. Some of the features the company stresses are feed screws available in three sizes, hopper with two straight sides, improved rotor design, etc. Literature will be sent to you if you

CIRCLE 24 ON SERVICE CARD

25—What's Your Fertilizer IQ?

"What is Your Fertilizer IQ?" is the title of a booklet from Armour & Co. It is partly made up with a question and answer section. The booklet also tells the advantages of using Regal Beads as a fertilizer conditioner. For a copy

CIRCLE 25 ON SERVICE CARD

26—Fertilizer Plant Equipment

Whether you plan to build a new plant or modernize your present plant, Sturtevant Mill Co. says it has a staff of engineers to help you with your granular fertilizer problems. For more information

CIRCLE 26 ON SERVICE CARD

27—Bagpak Fast Bag Machine

International Paper Co. says its Bagpak machine can tape or sew 15 bags a minute. It's also quickly adjustable for bags of from 25 to 100 lb. capacity. Dimensional drawings and detailed information are available in booklet ET-D-12. For a copy

CIRCLE 27 ON SERVICE CARD

28—Low-Cost Fertilizer Borates

A low-cost fertilizer borax, rich in boron, is produced by Pacific Coast Borax Co. It says water content is held to approximately 24 per cent. This material saves money in costs of transportation, storage and handling. For literature containing more information

CIRCLE 28 ON SERVICE CARD

29—Ball Mill Grinding

The ball mill has long been used in many industries where continuous production with minimum maintenance is required. Kennedy-VanSaun Mfg. & Eng. Corp. says its Radical Flow classifier makes possible production of a wide range of product sizes, by positive external adjustments, to a high degree of accuracy. For a free bulletin and technical data describing its equipment

CIRCLE 29 ON SERVICE CARD

30—Blended Emulsifiers

Toximuls are products of Ninol Laboratories, Inc. Ninol says its blended emulsifiers give spontaneous emulsification, long storage life and slow creaming emulsions in both soft and hard waters. For samples and bulletins

CIRCLE 30 ON SERVICE CARD

31—Electric Vibrolator

Bin stuck lately? That is the question asked by Cleveland Vibrator Co. It has a folder and an instruction sheet showing how its vibrolators operate. If you have a sticking problem, the company offers its engineering service. For a copy of its literature

CIRCLE 31 ON SERVICE CARD

32—100% Lindane

For highly effective control of many insects which destroy vegetable crops, fruits and berries and also a specific for certain parasitic insect pests which infest sheep, cattle, hogs, horses and poultry, Diamond Alkali Co. says its Diamond 100 per cent Lindane is a three-way killer. For more information

CIRCLE 32 ON SERVICE CARD

Buyers' Guide

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ALDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.
Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

AMMONIA—Anhydrous and Liquor
Commercial Solvents Corporation, New York City
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
Lion Oil Co., El Dorado, Ark.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Lion Oil Co., El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM PHOSPHATE
Monsanto Chem. Co., St. Louis, Mo.

AMMONIUM SULFATE
See Sulfate of Ammonia

AMMONIUM SULFATE NITRATE
Baker & Bro., H. J., New York City

BAGS—Burlap
McIver & Son, Alex. M., Charleston, S. C.

BAGS—Cotton
McIver & Son, Alex. M., Charleston, S. C.

BAGS—Multiwall-Paper
International Paper Co., Bagpak Div., N. Y. C.
Hammond Bag & Paper Co., Wellsburg, W. Va.
Hudson Pulp & Paper Corp., N. Y. C.
Kraft Bag Corporation, New York City
McIver & Son, Alex. M., Charleston, S. C.
Raymond Bag Co., Middletown, Ohio
Union Bag & Paper Corp., New York City

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

BAG CLOSING MACHINES
Fischbein Co., Dave, Minneapolis, Minn.
International Paper Co., Bagpak Div., N. Y. C.

BAG PRINTING MACHINES
Schmutz Mfg., Louisville, Ky.

BAG FILLING MACHINES
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

BHC AND LINDANE
Ashcraft-Wilkinson Co., Atlanta, Ga..
Diamond Alkali Co., Newark, N. J.
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

BONE PRODUCTS
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
McIver & Son, Alex M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—Hoist, Crane, etc.
Hayward Company, The, New York City

CALCIUM ARSENATE
American Agricultural Chemical Co., N. Y. C.

CARS AND CART
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

CASTOR POMACE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
McIver & Son, Alex. M., Charleston, S. C.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CHLORDANE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

CLAY
Ashcraft-Wilkinson Co., Atlanta, Ga.

CONDITIONERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

CONTROL SYSTEMS
Sackett & Sons Co., The A. J., Baltimore, Md.

CONVEYORS—Belt
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

COPPER SULFATE
Tennessee Corp., Atlanta, Ga.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R.. New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa

DDT
Ashcraft-Wilkinson Co.. Atlanta, Ga.
Diamond Alkali Co., Newark, N. J.
Mathieson Agricultural Chemicals Co., Little Rock· Ark.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

DIELDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

DILUENTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.
Summit Mining Corporation, Carlisle, Pa.

DITHIOCARBAMATES
Berkshire Chemicals, New York City

DRYERS
Sackett & Sons Co., The A. J., Baltimore, Md.

ELEVATORS—Bucket
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

EMULSIFIERS
Atlas Powder Co., Wilmington, Del.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City
Fairlie, Inc., Andrew M., New York City
General Industrial Development Corp., N. Y. C.
Marietta Concrete Corporation, Marietta, Ohio
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.
Titlestad Corporation, Nicolay, New York City

FERTILIZER—Mixed
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Mathieson Agricultural Chemicals Co., Little Rock Ark.

FILLERS
Bradley & Baker, N. Y. C.
McIver & Son, Alex. M., Charleston, S. C.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

FULLER'S EARTH
Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES
American Agricultural Chemical Co., N. Y. C.
Berkshire Chemicals, New York City
Tennessee Corp., Atlanta, Ga.

HERBICIDES
Diamond Alkali Co., Newark, N. J.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

HERBICIDES—Oils
Lion Oil Company, El Dorado, Ark.

HOPPERS & SPOUTS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind..

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Berkshire Chemicals, New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
Diamond Alkali Co., Newark, N. J.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.
U. S. Industrial Chemicals Co., New York City

IRON SULFATE
Tennessee Corp., Atlanta, Ga.

LEAD ARSENATE
American Agricultural Chemical Co., N. Y. C.

LIMESTONE
American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

LOADERS—Car and Wagon
Sackett & Sons Co., The A. J., Baltimore, Md.

Buyers' Guide

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Acidulating
Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Granulating, Fertilizer
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Gruendler, Crusher & Pulverizer Co., St. Louis, Mo.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Clark Equipt. Co., Construction Mach. Div., Benton Harbor, Mich.
Hayward Company, The, New York City
Hough, The Frank G. Co., Libertyville, Ill.
Lessman Mfg. Co., Des Moines, Ia.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Power Transmission
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY
Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MAGNESIUM SULFATE
Berkshire Chemicals, New York City

MANGANESE SULFATE
McIver & Son, Alex. M., Charleston, S. C.
Tennessee Corp., Atlanta, Ga.

MANURE SALTS
Potash Co. of America, Washington, D. C.

MINOR ELEMENTS
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

NITRATE OF POTASH
Berkshire Chemicals, New York City

NITRATE OF SODA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS
Commercial Solvents Corporation, New York City
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

NITROGEN MATERIALS—Organic
American Agricultual Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackie, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

PARATHION
Ashcraft-Wilkinson Co., Atlanta, Ga.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

PENTACHLOROPHENOL
Monsanto Chemical Co., St. Louis, Mo.

PHOSPHATE ROCK
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

PHOSPHORIC ACID
American Agricultural Chemical Co., N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.

PLANT CONSTRUCTION—Fertilizer and Acid
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
General Industrial Development Corp., N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation Nicolay, New York City

POTASH—Muriate
American Potash & Chemical Corp., N. Y. C.
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Potash Co. of America, Washington, D. C.
Southwest Potash Corporation, New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate
American Potash & Chemical Corp., N. Y. C.
Baker & Bro., H. J., New York City
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Potash Co. of America, Washington, D. C.

POTASSIUM PHOSPHATE
Monsanto Chemical Co., St. Louis, Mo.

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

REPAIR PARTS AND CASTINGS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SACKING UNITS
Sackett & Sons Co., The A. J., Baltimore, Md.

SCALES—Including Automatic Baggers
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SCREENS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SEPARATORS—Air
Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

STORAGE BUILDINGS
Butler Manufacturing Co., Kansas City, Mo.
Marietta Concrete Corporation, Marietta, Ohio

SULFATE OF AMMONIA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Jackie, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
Mathieson Agricultural Chem'ls Co., Little Rock, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
McIver & Son, Alex. M., Charleston, S. C.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Davison Chemical Corporation, Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackie, Frank R., New York City
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
McIver & Son, Alex. M., Charleston, S. C.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackie, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TEPP
Monsanto Chemical Co., St. Louis, Mo.

TOXAPHENE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr., Chem. Div., Pittsburgh, Pa.

2, 4-D
Diamond Alkali Co., Newark, N. J.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

2, 4, 5-T
Diamond Alkali Co., Newark, N. J.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

UREA & UREA PRODUCTS
Baker & Bro., H. J., New York City
Bradley & Baker, N. Y. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C

VALVES
Atlanta Utility Works, The, East Point, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.

ZINC SULFATE
Tennessee Corp., Atlanta, Ga.

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Sul-Po-Mag®

WATER-SOLUBLE ($K_2SO_4 \cdot 2MgSO_4$)
DOUBLE SULFATE OF POTASH-MAGNESIA

CONTAINS SOLUBLE MAGNESIUM

in

on

THE FOURTH ELEMENT

Harold Ostbold, Asst. Prof. of
University of Minnesota
Institute of Agriculture
St. Paul 1, Minn.

put it in the bag — put it on the bag

Dealers are looking for the analysis on the bag that shows the fertilizer contains *soluble magnesium, the fourth plant food element.* In many crop-growing areas from coast to coast, their farmer customers are getting finer quality, more profitable crops on magnesium-deficient soils when they use fertilizer containing soluble magnesium.

More and more fertilizer manufacturers are including *Sul-Po-Mag* in their quality grades in order to supply soluble magnesium in the most practical and economical form.

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By including *Sul-Po-Mag* in the bag, you supply the farmer with a better quality fertilizer, properly balanced with the basic nutrients required for healthy crop growth and profitable yields. It will pay you... in added prestige and performance of your fertilizer ...to include soluble magnesium—the fourth element in your quality grades. So...when you put it *in* the bag, put it *on* the bag, too: Nitrogen, Phosphate, Potash, *Magnesium.*

MURIATE OF POTASH • SULFATE OF POTASH • SUL-PO-MAG

Mined and Refined at Carlsbad by International for Fertilizer Manufacturers

Potash Division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6